THE

Volume Fifty-Five

Journal

OF THE

AMERICAN OSTEOPATHIC ASSOCIATION

INTERNISTS NUMBER

Number 6 | 212 East Ohio St., Chicago 11, Ill. | February, 1956

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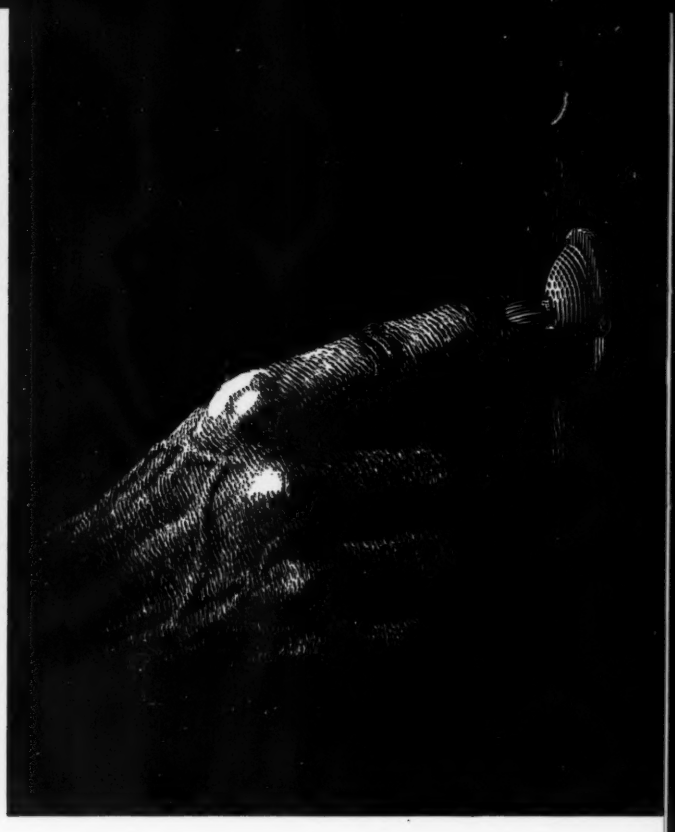

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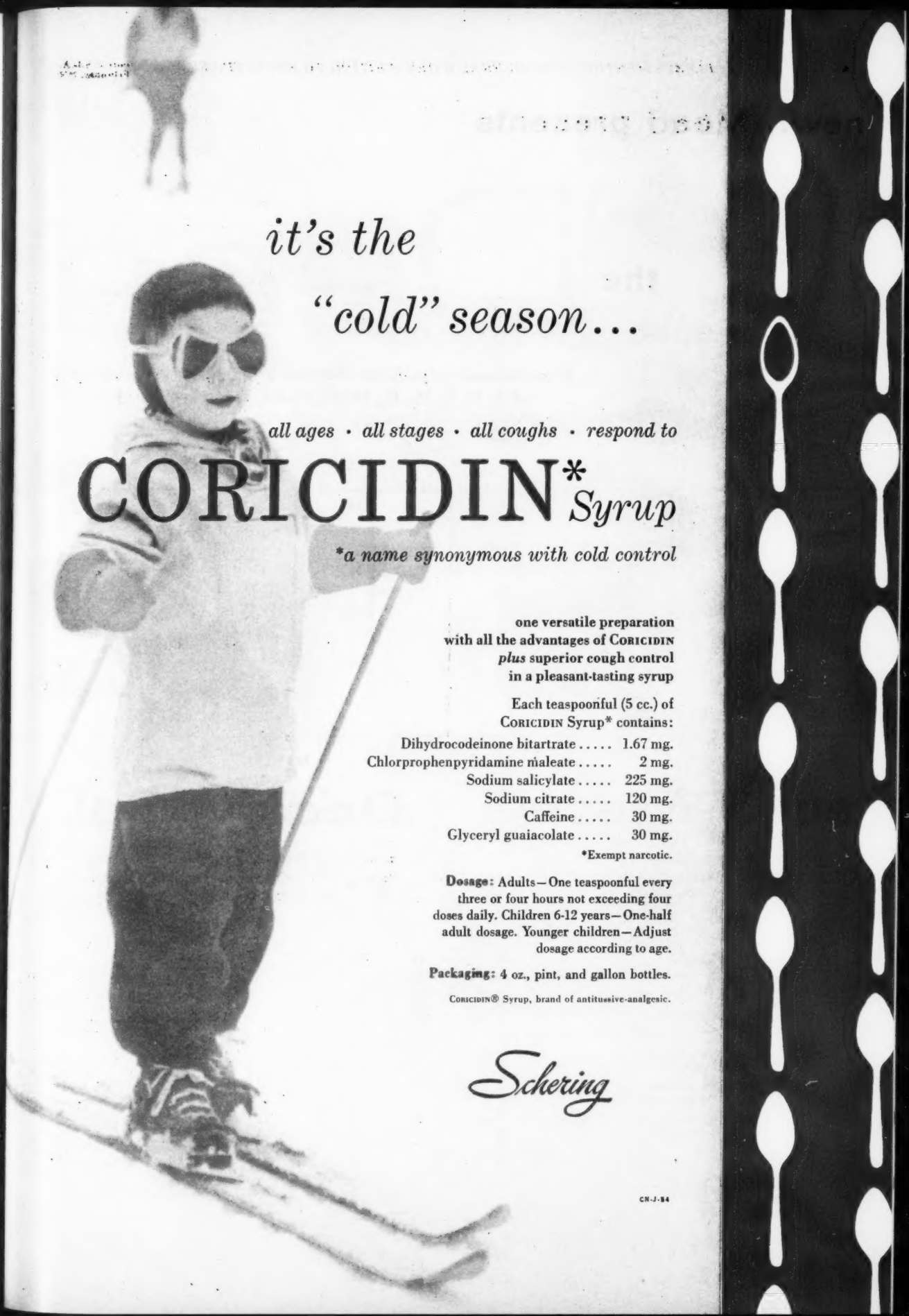

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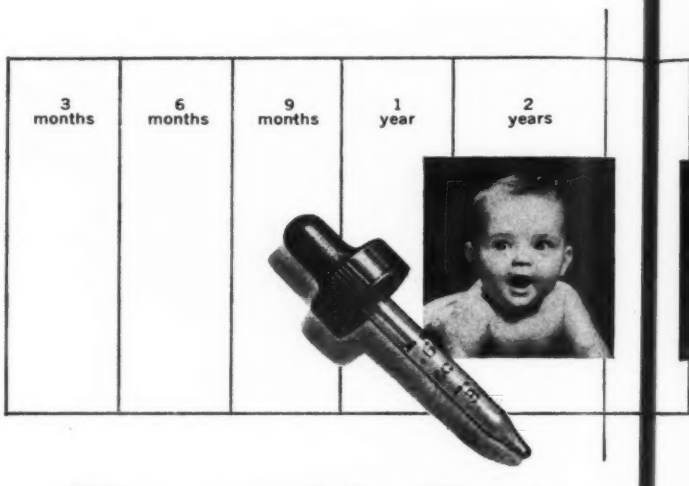

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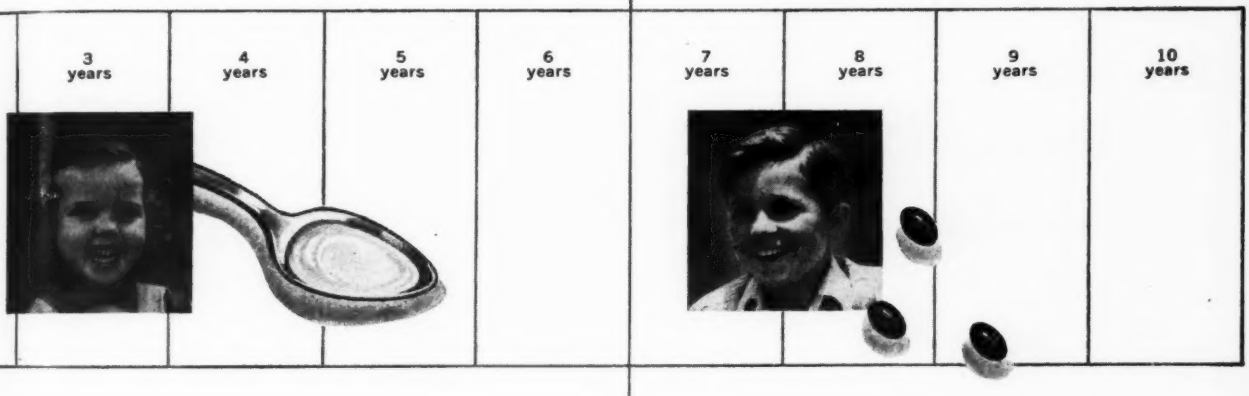

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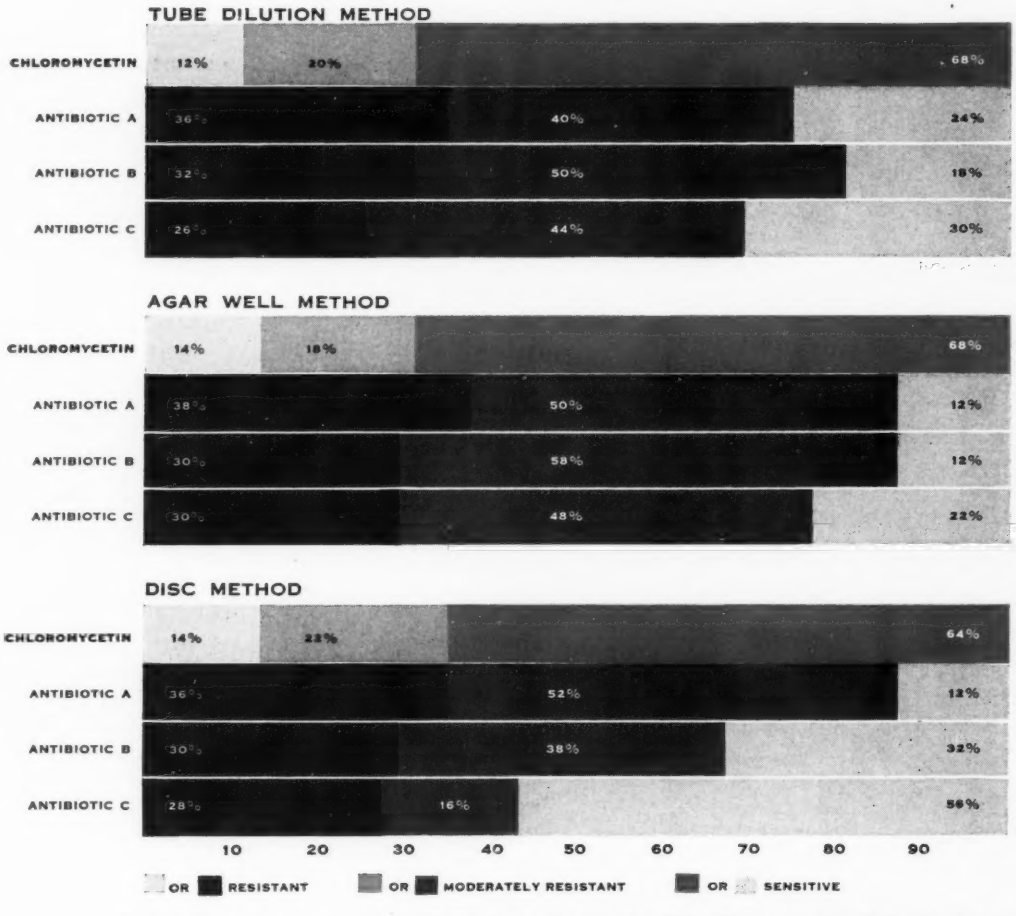

*Breakdown of gram-negative bacilli—Coli: 11; Proteus: 10; *Klebsiella pneumoniae:* 9; Aerobacter: 7; Pseudomonas: 7; Achromobacter: 2; Paracolon: 2; *Salmonella typhosa:* 1; *Bacterium anitratum:* 1. Adapted from Branch, A.; Starkey, D. H.; Rodgers, K. C., & Power, E. E.: Antibiotics Annual, 1954-1955, New York, Medical Encyclopedia, Inc., 1955, p. 1125.

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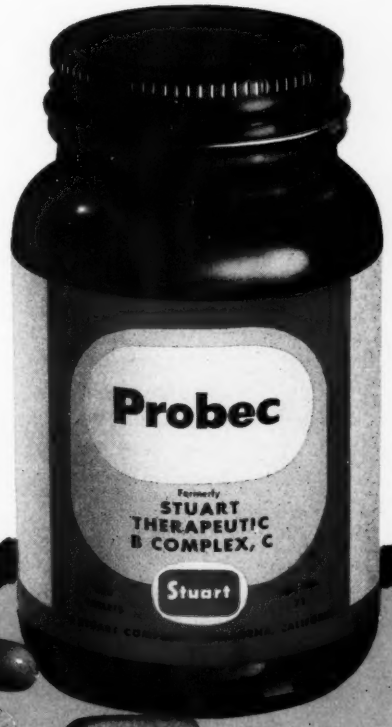

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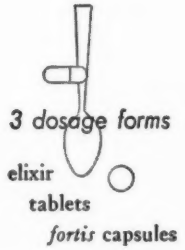

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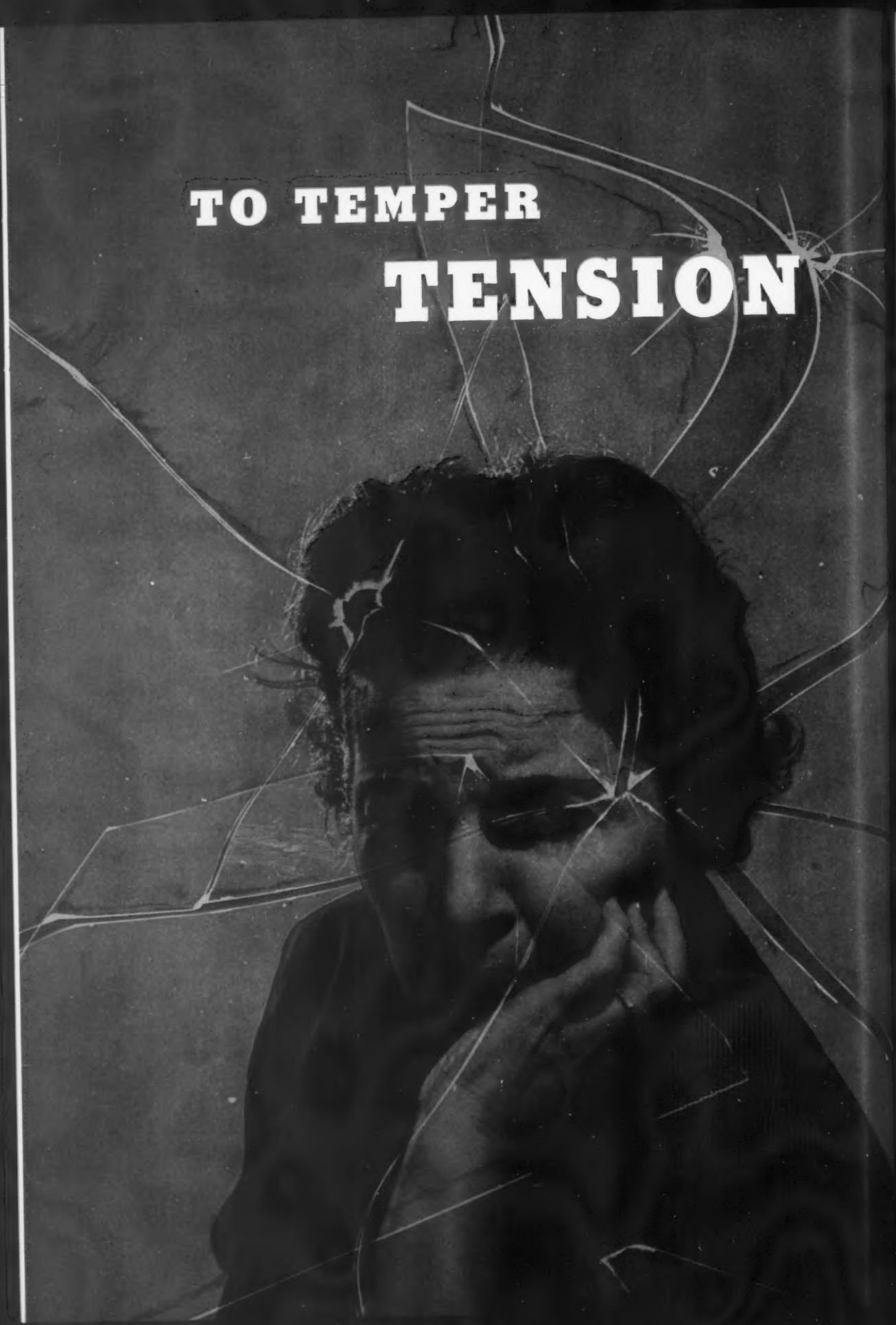
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1. Butler T. C.; Mahaffee, C., and Waddell, W. J.: Phenobarbital: Studies of Elimination, Accumulation, Tolerance, and Dosage Schedules, J. Pharmacol. & Exper Therap. 111:425 (Aug.) 1954.

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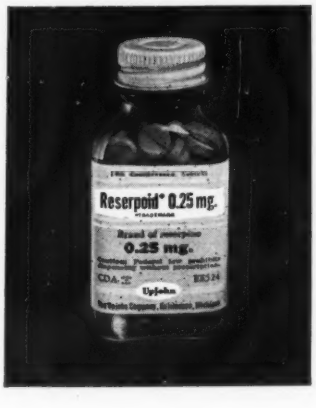

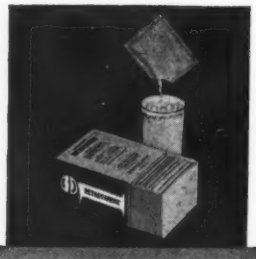

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References: 1. Dixon, H. H., and others: West. J. Surg. *62*:338 (June) 1954. • 2. Jones, C. H.: (in press). • 3. Watkins, A. L.: New England J. Med. *248*:621 (April 9) 1953. • 4. Aldes, J. H.: Bull. Biol. Sciences Foundation *1*:4 (April) 1954.

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1. Bradley, J. E.: Mod. Med. 20:71, No. 20, 1952.

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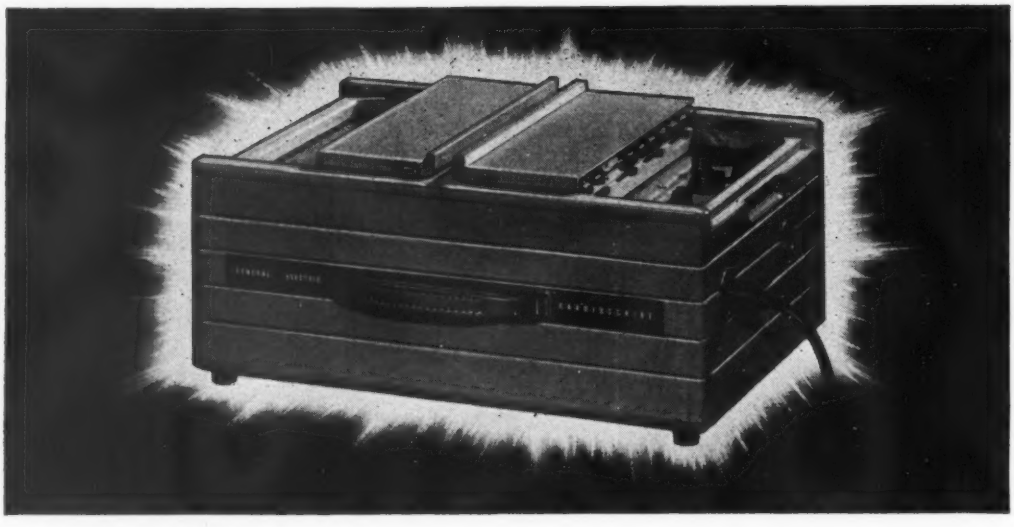

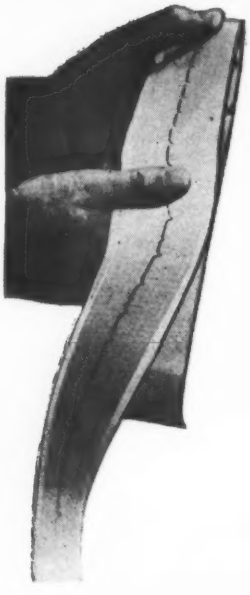

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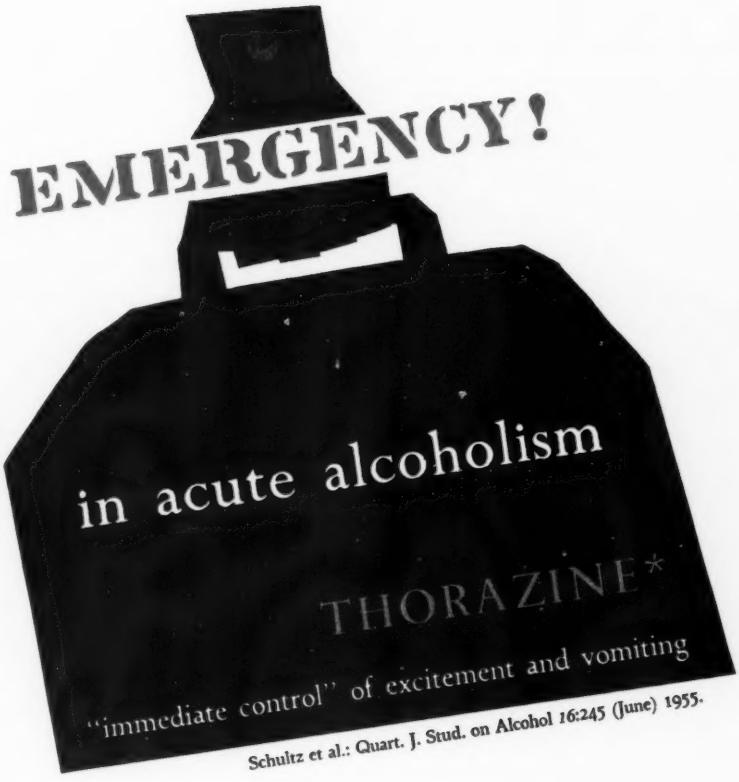
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1. Groskloss, H. H. et al.: Bonadoxin®: a unique control for nausea and vomiting of pregnancy. Clin. Med.: 2:885 (Sept.) 1955.

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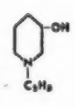

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The Importance of the Dorsolumbar Junction*

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INTRODUCTION

In the over-all consideration of the structural integrity of the body, there is probably no one area that is more important than another except, perhaps, as regards the specific predisposing or exciting etiologic factor in an individual case. Some areas may, however, by virtue of their peculiar structure or relationships have a greater importance in the development of structural derangements—with consequent development of the disease of the patient—than other areas. This is true of the whole problem of weight bearing on the lumbar spine, still inadequately adapted to the orthograde posture of man. This is true of the fifth lumbar with its tendency for anomalous development, its position at the base of the weight bearing column, and its poor resistance to side bending and rotational strain. This is true of the tendency for injury at the site of the upper cervicals and the base of the skull, due in part to the buttresses and dural attachments which paradoxically have helped provide some of the strength to connections of the spine to the skull. When we therefore single out the dorsolumbar junction, it is to analyze its relations and its place in the musculoskeletal problems and structural patterns of our patients rather than to attach any unusual significance to it.

ANATOMICAL CONSIDERATIONS

In spite of this preamble, there is a particular significance of the dorsolumbar area that will give us a clue to some clinical conditions. The location of the lumbar enlargement of the cord is between the tenth dorsal and the second lumbar vertebral segments.[1] This, as we know, is due to the disproportionate growth of the spinal cord and the spinal column, with relative migration of the terminals of the cord, although there is a relative equality of the two at about the third month of gestation. This uneven growth causes a proportionate increase of length of the spinal nerves, to bridge the distance from the conus terminale to the respective intervertebral foramina.[2]

This anatomic location and relative proximity of the central fibers and therefore of the connector neurons between the first lumbar and the fifth sacral or even the coccygeal nerves suggests the possible ease of production of phenomena related to facilitation in these areas. That is, with facilitation present over the fifth lumbar vertebra, stimuli transmitted from the twelfth lumbar might produce a discharge of impulses at the fifth lumbar. We know of this phenomenon through the work of Denslow and Korr and their coworkers.[3] A particularly fine contribution was made last year in the symposium on segmental facilitation.[4]

Perhaps the most important consideration in this peculiar arrangement of nerves and their relation to the vertebral column is the relation of the lumbar enlargement to the spinal arterial, venous, lymphatic, and cerebrospinal circulation. One of the most important and perhaps least explored phases of osteopathic etiology is in the segmental spinal changes related to mechanical strains or osteopathic spinal lesions of those segments. Burns[5] has indicated vascular changes relative to periarticular tissue including the various phases of vasomotor reaction, followed by alteration in the capillaries and small vessels, including hemorrhage by diapedesis, and subsequent changes of organization, resorption, formation of scar tissue, and fibrosis. Some of these must directly affect the spinal organ as well.[6] There is also edema, congestion, and the interference with lymphatic and venous activity which certainly is responsible for intraspinal edema, congestion, hemorrhage, and subsequent organization, thickening, scar tissue formation, and fibrosis. Therefore, changes occurring between the tenth dorsal and the second lumbar, especially around the transitional twelfth dorsal vertebra, could affect the central environment of the cells of the entire bulb and cauda equina. Unfortunately, we tend to look for this as the explanation of symptoms only in severe trauma with gross paralytic effects. Minor disturbances of an acute nature might be similarly related to intraspinal circulation, as might certain mysterious degenerative changes of a more chronic nature, including the various atrophies and dystrophies related to the lower extremities.

ILLUSTRATIVE CASES

One of the practices in osteopathic structural diagnosis including the various modifications of "reflex" diagnosis is to relate the pain, tenderness, soft tissue

*Presented at the Instruction Course, General Practice and Peripheral Vascular Disease, at the Fifty-Ninth Annual Convention of the American Osteopathic Association, Los Angeles, July 15, 1955.

findings, et cetera to the spinal level. This is sound as far as it goes, and it requires basic knowledge of neuroanatomy and gross anatomy. But then the tendency is to stop at the related intervertebral foramen and seek altered structural changes at the two vertebrae or segments forming that particular foramen. Assume a case with symptoms referable to the lateral femoral cutaneous nerve with some involvement of the obturator nerve. There is tension in the adductors and possibly paresthesias along the medial and lateral thigh, and perhaps some subcutaneous lymphatic nodules are palpated in related areas. There are also minor disturbances of the genitourinary and gastrointestinal tracts. Physical diagnosis and laboratory methods fail to indicate any advanced pathologic changes in these latter areas. There is also an absence of embolic phenomena, et cetera, related to the thigh.

The correct assumption would be to relate these disturbances to the levels of the second and third lumbar nerves. The next step would probably be to examine the second, third, and fourth lumbar vertebral relations, or some form of manipulation—mobilization, inhibition, or stimulation—might be attempted in these areas. Very little or no beneficial effect would result, if the disturbances were actually due to mechanical changes between the eleventh and twelfth dorsal vertebrae which were producing vascular changes at the level of the spinal connections of the second and third lumbar vertebrae. Now this is perhaps an unlikely situation inasmuch as even the most superficial spinal palpation would probably reveal the changes at the dorsolumbar junction, and treatment would be directed there accordingly. But if this is done without a correlation of findings, or despite apparently inconsistent findings, it is still not the highly desired scientific application of osteopathic principles.

For another illustration, let us take an actual case in which there were symptoms of acute strain in the lumbosacral area. There was point tenderness near the attachments of the lumbosacral ligament (upper fibers) between the fifth lumbar and first sacral spines. There was pain of a sciatic distribution. Treatment directed to the lumbosacral area was of little avail and the symptoms continued. When treatment was directed to the area of the twelfth dorsal and the first lumbar, the lumbosacral symptoms began to abate even when little or no treatment was directed to the lumbosacral area.[7] I suspect that this case demonstrated lumbar involvement through circulatory changes at the dorsolumbar level with subsequent altered reflexes via the fifth lumbar nerve.

One situation where the difference between effects due to vertebral changes at the level of the related intervertebral foramina and those of more central origin is unwittingly acknowledged is the one where there is involvement related to the sacral nerves, which exit from the normally immovable sacral segments. These could be, as first suggested, facilitated reflexes fired by stimuli from lumbosacral or higher peripheral irritation or, as suggested now, from changes resulting from altered mechanics between the twelfth dorsal and the first and second lumbar vertebrae affecting the vascular supply or altering drainage of the lumbar bulb.

If this emphasis on mechanics in hypothetical and actual case histories helps in the management of some previously difficult or recurrent low back case, it will have been worth while. There are other considerations which point up the importance of this area. Nelson and Hoover,[8] Dunnington,[9] Keith,[10] Goldthwait,[11] and Judovich and Bates[12] have stressed the importance of body mechanics as the body has assumed the upright position. The osteopathic investigators have seen the specific mechanical changes inherent in this adaptation. But whereas Nelson and Hoover[8] and Dunnington[9] described very similar lateral curves, each seems to place the primary strain of such curves in a different area. Nelson and Hoover point to the law of bending moment and emphasize the fact that side bending strain is greatest at the apex of the curve (or curves) or at the point where the vertebrae are farthest from the midline. Dunnington considers the side bending curve and strain entirely as part of the rotation and reverse rotation—all compensatory to a basic lumbosacral rotational strain. Kleinberg[13] sees side bending as the primary factor in the development of scoliosis with the degree of rotation at the apex of the curve as indicative of the severity of the organic scoliosis. Fryette[14] has realistically added another dimension or an additional factor, namely, the consideration of flexion and extension and the anteroposterior curves as a component of movements involving side bending and rotation. I submit that the basic rules of motion and of spinal mechanics will be found consistent and inherent in the anatomic blueprint that we happen to be handling. Many of the differences are due to the individual variations of musculoskeletal development, and no one may rest securely on a particular expected pattern until he has thoroughly examined the individual patient who presents him with a problem.

But to return to the matter of side bending strain and rotation strain. In the spine presenting compensatory curves, the apex of the curves will represent, as Nelson[15] emphasizes, the point of maximum side bending strain (weight times the distance from the midgravity line). And so long as the curve reverses itself, the crossover point will represent the minimal side bending strain (weight times zero). But because of the muscular activity entering into the maintenance of these curves and to the extent that there is rotation (into the convexity of the curve—which is consistent with Kleinberg[13] and with the latexion group lesion of Fryette[14]) this rotation will be found reversed in the next curve. The rotation strain will be minimal at the apex of the curve and maximal at the crossover, which will be in the area of the dorsolumbar junction.

Rotation strain is perhaps the strain for which we are most poorly adapted, partly because the activities producing it are the action of powerful muscles through long leverage whereas the restraining protective muscles are short and afford short leverage (the rotatores, multifidus, et cetera). Furthermore, the transitional nature of the dorsolumbar area—transitional both in structure and in the type and direction of motion—makes it evident that no consideration of low-back strain or of the lumbar curve is adequate if it ignores the relationship of strain at the lumbosacral junction.

The particular transition that concerns us in the mechanics of this area is the change in direction of the articular facets and the motions implicit in these changes. This change is usually characteristic of the twelfth dorsal although it could be the eleventh dorsal or the first lumbar. The upper facets are dorsal in nature tending to face backward, upward, and laterally, permitting some rotation around an anterior axis above them. The lower facets are narrowed and brought around more to the sagittal plane in order to conform to the upper facets of the lumbars, facing backward, upward, and medially. The lumbar type of facet permits some degree of rotation, but only around a posterior axis (at or near the tip of the spinous processes

—or around one or the other facet—a pivot type of motion).

Rotation through the dorsal area is limited by the action of the ribs, intercostal muscles, et cetera. This restraint is minimal in the lowest dorsals. Therefore a rotating force down the dorsals would tend to accumulate toward the transitional vertebra; there, that particular motion tends to be inhibited at the transitional point by the change of facets. Either the upper (dorsallike) articulations must exaggerate the motion or the lower (lumbarlike) articulations must be traumatized by it if it occurs with any degree of severity or suddenness. A somewhat converse situation would occur with strain accumulating from below upward. However, the tendency might be for an increase in the amount of injury in the dorsal area as a result of side bending strain in the lumbars, for which the lumbar vertebrae would be better adapted, and which would in turn be inhibited in the mid and upper dorsals by the rib positions as well as the facet facings. These points are important, not only in order that we may understand the etiology of lesioning but also that we may make our manipulative technics effective. It is probably far easier to produce motion at the dorsolumbar junction (especially in lateral recumbent or twisting technics) than it is to limit it to specific lumbar, lumbodorsal, or sacroiliac areas.

Before leaving the relation of the dorsolumbar area to curves of the spine, it should be mentioned that because of the relative rigidity of the thorax and the pelvis and the accumulation of strain at one end or the other of the five lumbar vertebrae, lordosis, kyphosis, or respective increases in the physiologic anteroposterior curves of the lumbar and dorsal column may produce exaggerated movement at either lumbosacral or dorsolumbar junctions. Because weight-bearing strains are even greater at the lumbosacral than at the dorsolumbar junction, there is frequently found considerable restriction of motion at the lumbosacral end and an increase of motion at the dorsolumbar end.

This type of hypermobility may not be important in itself except to point up the restriction in the lower area, but it uses up the adaptability of these transitional segments; hence this may be the site of superimposed strain with severity of symptoms which might otherwise appear disproportionate to the amount of local vertebral injury. This sort of accumulated hyperactivity and strain at the lumbodorsal junction may account for the change noted when palpating down the dorsal spine, sometimes described as a "break" in the pattern—probably a hyperflexion or hyperextension. If this "break" is the site of superimposed strain, it then becomes of vital importance in the treatment of any conditions related to innervation from the dorsolumbar area.

Other anatomical considerations in the area should be mentioned because they re-emphasize the integration of the musculoskeletal system. Among these is the lessened rigidity of the lower parts of the thoracic cage, because the angular relations of the lower ribs and the "floating" of the lowest ribs make more motion possible at the dorsolumbar area. This is more of an asset than a liability because it tends to permit distribution of strain rather than centering it entirely at one transitional vertebra. But, again, the very relations of the lower ribs involve them in dorsolumbar strain and, conversely, disturbances of the lower ribs may be productive of such strain. The attachments of the quadratus lumborum to the crest of the ilium and the twelfth rib involves the lower ribs and hence the "junction" in altered crest levels, and probably in altered sacral and femoral head levels. The highest attachments of the psoas muscle involve the "junction" in lumbar mechanics and affections of the hip and thigh. Here there may be not only mechanical involvement with local reflexes affecting the spinal segments already mentioned, but also complications due to the relation of the psoas and its fascia to the lumbar plexus.

There is the possibility of altered diaphragmatic function affecting the dorsolumbar area, inasmuch as the crura of the diaphragm attach as low as the second and third lumbar vertebral bodies and the upper attachments include the lower six ribs. The precarious and almost antlike attachments of the bony skeleton of the thorax and pelvis serve to remind us of the tremendous responsibility of the muscles and fascia of the lumbodorsal area in maintaining the erect position and in controlling the almost constant motion, tension, and balance of the human body. Often of primary importance are the long muscles of the back which may be productive of acute or chronic changes in this area. Especially important are the lumbocostal group of the erector spinae muscles and the long latissimus dorsi, with its attachments not only to the pelvis but also to the lowest three ribs on its way to the upper extremity.

DIAGNOSIS OF DORSOLUMBAR LESIONS

The diagnosis of lesions in this area is basically similar to diagnosis in any other spinal area. The review of anatomic relations should serve to indicate a wide group of symptoms and complaints which could be associated with this area, including low-back pain and lower extremity involvements, dorsal and upper extremity involvements, and beginning visceral dysfunctions which might or might not be demonstrable by laboratory methods. The last would include lower intestinal, suprarenal, renal, and genitourinary changes.

A complete structural examination might tie in the dorsolumbar area with altered pelvic levels (as has been suggested) and with low lumbar strain, especially that associated with rotation, pelvic torsion, and pelvic sideshift.

Part of the structural examination should include tests, such as those advocated by Perrin T. Wilson,[16] for noting regional limitation of side bending, rotation, et cetera. Such tests might include noting deviation from the balanced position when the patient attempts forward bending, straight leg raising, bending from the sitting position (shoelace test), and approximation of the head to one foot in the seated position (toe to nose test). These will, of course, give positive indications of pain or limited motion in lumbar involvement. If the lumbar involvement is minimal or chronic, whereas the dorsolumbar is more acute, pain or tension or both will be elicited in the higher lumbar and dorsolumbar areas.

The use of the erythema friction test of Northup[17] will certainly show local variations, although this area is close to the lumbar area, where the friction required to produce erythema increases. However, comparison of corresponding points on the two sides of the spine should help to localize some vasomotor changes.

Further localization of lesion changes requires superficial and deep palpation. This is best done by noting the position of spinous processes and attempting to determine the position of the vertebrae by palpation of the tissues immediately lateral to the spinous processes, with the patient in the prone position. Local motion can be checked best with the patient sitting, his arms clasped behind his neck. The operator controls

the various motions with his hand at the patient's elbows or by passing his hand under one arm of the patient and across the patient's chest and holding onto the opposite upper arm. The operator's other hand is used to palpate the intervals between the contiguous spines and any changes in position of the spines with the various motions. The spine of the eleventh dorsal will deviate opposite to the rotation of the vertebral body. Where transition to the lumbar facets occurs, usually at the twelfth, such deviation will not be as noticeable, but since the body of the vertebra shifts with attempted rotation (lumbar type rotation with posterior axis or pivot) lateral palpation may help determine the relative position of the transverse processes.

Point tenderness will usually be elicited between the spinous processes of the involved vertebra. Point tenderness may be present also at the side of the tip of the spinous process opposite the side toward which the vertebra is rotated, and often in the belly of the large muscles on the opposite side. Deep muscle spasm and tenderness are usually on the side toward which the vertebral body is rotated.

Palpation of the lower ribs with the patient prone and palpation of the lower ribs and costal cartilages with the patient supine will help determine the extent of rib involvement. Tension in the quadratus lumborum will sometimes be associated with a lowering of the twelfth rib and can be confirmed by lateral palpation with the patient prone or supine.

Mild or acute pain with respiration will occur with rib involvement and with diaphragmatic involvement. Diaphragmatic involvement may give rise to a wide range of symptoms, including gastrointestinal disturbances, but rib involvement alone can usually be confirmed by tenderness anteriorly and laterally at the corresponding anterior and anterolateral distribution of the sensory endings of the intercostal nerves.

TREATMENT OF LUMBODORSAL LESIONS

Since the lumbodorsal area is particularly prone to be involved in various compensatory changes, there is quite a problem in management. It is difficult to determine whether all involved areas should be treated simultaneously, or whether the first attention should be given to the primary or secondary involvement. Some attention should be given to the patient's chief complaint. If the dorsolumbar symptoms are particularly acute, it might be well to relieve them first despite the possibility of underlying lumbosacral involvement. Then, at subsequent visits, the underlying problem should receive attention. Occasionally, treatment of the underlying disturbance will clear up the compensatory changes. This is probably only true where the entire pattern has been recently or suddenly acquired. The history of the case may help to determine such a possibility.

Having made accurate diagnosis of the positions of the vertebrae or the directions of limited motion, I treat the problem by reversing the position or increasing the desired motion. The type of treatment, whether soft tissue, geriatric springing, or articulating technic or thrust technic, and the use of various adjuncts has been discussed by Beckwith,[18] Thomas,[19] and Heilig.[20]

The same principles hold with respect to the lumbodorsal area. As for specific technics, where there is rotation involvement the lateral recumbent position has always proved the most efficacious for me, provided that a palpating hand can determine that the corrective motion is being localized to the desired segments. The straightening of the patient's lower limb (limb toward the table) often helps lock the lumbar area both by approximation of the facets and by slight tension on the lumbar bodies by virtue of the resultant psoas pull. The supine technic with the patient's arms crossed or hands clasped behind his neck may be more effective in flexion or extension type lesions, the pressure of the fulcrum hand upward (anterior) and cephalad against the upper of the two vertebrae in lesion in the backward bending (extension) lesion, or sustaining the lower segment as the upper is carried over it into extension in the flexion (forward bending) lesion.[21]

Prone technics are precarious because of the lack of bony support anteriorly at this junction, but pressure may be maintained against the lower ribs and transverse processes of the lower dorsals as the pelvis is raised on the same side. This is sometimes an effective rib technic, and, in that connection, since we have noted the relation of ribs and rib involvement to the dorsolumbar junction, any rib technics may be utilized in the complete picture of normalization.

SUMMARY AND CONCLUSIONS

An attempt has been made to emphasize the interrelation of the dorsolumbar junction with structural conditions of the entire body rather than to attach undue importance to it. Nevertheless, the transitional nature of this area has also been emphasized as have some of the sources of its involvement, particularly those associated with the strains of maintaining balance and co-ordination in the upright position.

The possibility has been suggested of involvement of a number of spinal segments through the relations of the lumbar enlargement with its sources of the lumbar, sacral, and coccygeal nerves arising from the lower two or three dorsals and upper one or two lumbar vertebral segments because of segmental effects on circulation to the area of cord attachment and, therefore, the possibility of symptomatology not at first related by the physician to the dorsolumbar area.

The diagnosis of dorsolumbar lesioning has been reviewed with emphasis on it as a part of the complete structural examination of the patient. The approach to manipulative treatment has been indicated. It has been implied that the efficacy of this treatment is intimately related to the accuracy of diagnosis.

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REFERENCES

1. Schaeffer, J. P.: Morris' Human anatomy. Ed. 11. Blakiston Co., Philadelphia, 1953.

2. Ingham, S. D.: Diseases of conus terminalis and cauda equina, in Cyclopedia of medicine, surgery, specialties, edited by G. M. Piersol. F. A. Davis Co., Philadelphia, 1952, vol. 12, pp. 867-879.

3. Denslow, J. S., Korr, I. M., and Krems, A. D.: Quantitative studies of chronic facilitation in human motoneuron pools. Am. J. Physiol. 105:229-238, Aug. 1947.

4. Korr, I. M., Thomas, P. E., and Wright, H. M.: Symposium on functional implications of segmental facilitation. J. Am. Osteop. A. 54: 265-282, Jan. 1955.

5. Burns, L., Chandler, L. C., and Rice, R. W.: Pathogenesis of visceral disease following vertebral lesions. American Osteopathic Association, Chicago, 1945.

6. Burns, L.: Studies in osteopathic sciences. Vol. 1. Basic principles. Occident Library, Los Angeles, 1907.

7. Heilig, D.: Case record JBP 1-21-54.

8. Hoover, H. V., and Nelson, C. R.: Basic physiological movements of spine. Academy of Applied Osteopathy Year Book, 1950, pp. 63-66.

9. Dunnington, W. P.: Fundamental basis of osteopathic therapy. Academy of Applied Osteopathy Year Book, 1943-44, pp. 12-18.

10. Keith, A. K.: Man's posture; notes on its evolution, in The injured back and its treatment, edited by J. D. Ellis. Charles C Thomas, Springfield, Ill., 1940, pp. 3-16.

11. Goldthwait, J. E., *et al.*: Essentials of body mechanics in health and disease. Ed. 5. J. B. Lippincott Co., Philadelphia, 1952.

12. Judovich, B. D., and Bates, W.: Segmental neuralgia in painful syndromes. F. A. Davis Co., Philadelphia, 1944.
13. Kleinberg, S.: Scoliosis. Williams & Wilkins Co., Baltimore, 1951.
14. Fryette, H. H.: Principles of osteopathic technic. Academy of Applied Osteopathy, Carmel, Calif., 1954.
15. Nelson, C. R.: Lecture at Philadelphia College of Osteopathy (Visiting Lecturers' Program).
16. Wilson, P. T.: Lecture at Philadelphia College of Osteopathy (Visiting Lecturers' Program).
17. Thomas, R. B.: Postural dynamics. J. Am. Osteop. A. 54:91-95, Oct. 1954.
18. Beckwith, C. G.: Physiology of treatment of Still lesion. J. Am. Osteop. A. 50:297-302, Feb. 1951.
19. Thomas, R. B.: Lecture at West Virginia Osteopathic Association meeting, 1949.
20. Heilig, D.: Why specific osteopathy? Academy of Applied Osteopathy Year Book, 1953, pp. 51-56.
21. Heilig, D.: Kyphosis. J. Am. Osteop. A. 54:155-159, Nov. 1954.

The Application of Osteopathic Principles in the Management of Arthritis*

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"Osteopathic principles" to me means that particular philosophy demonstrated by Dr. Andrew Taylor Still when he established the osteopathic school of medicine in an effort to improve the art of healing. Osteopathic principles teach that the body develops disease because of abnormality, but that it has within itself the power to improve in health if the abnormality is corrected. The osteopathic concept of disease includes the whole body rather than just the affected body part.

If disease is to be treated, it is necessary to be aware of what causes disease. If the most beneficial results are to be secured in treating disease, the causes as well as the effects must be treated. If arthritis is to be managed intelligently, there must first be a basic understanding of the complex syndrome of which it is only a symptom. Physicians are in a better position to examine and treat the patient when they have a complete understanding of why the patient has arthritis.

It is my firm conviction that any abnormal condition which exists within the patient's body is a part of the cause of arthritis. Any stress factor, whether psychic or physiologic, is part of the cause.

Most so-called diseases are those of differentiation and conceal the true nature of disease.[1] Arthritis is usually defined as a disease of the joints. Multiple sclerosis is usually thought of as a disease of the spinal cord and nervous system. But these conditions are no more distinctive than migraine, angina pectoris, or eczema. In each case, emphasis is placed on the organ or system involved. These conditions are not diseases but the result of disease. Disease, in its broader definitions, means an abnormal state of the body as a whole.

The word "arthritis" can be divided into two parts —*arthro,* joint, and *itis,* inflammation. The suffix *itis* has the same meaning, inflammation, whether it is used with reference to the appendix (appendicitis), the colon (colitis), or the tonsils (tonsillitis). Inflammation of a joint can be arrested, but the advanced joint changes which have occurred because of the inflammation cannot be corrected. That is why it is so important to recognize arthritis in its earliest stages when permanent beneficial results can be expected from treatment.

There are many types of arthritis included in the usual classifications. In the newer books, pages are sometimes given to classification of the arthritides and to the etiology of each classification. However, all arthritis can be classified into two general types: rheumatoid arthritis and osteoarthritis.

RHEUMATOID ARTHRITIS

Rheumatoid arthritis is synonymous with a host of commonly used terms that include atrophic arthritis, ankylosing arthritis, proliferative arthritis, chronic infectious arthritis, chronic nonspecific infectious arthritis, primary progressive arthritis, focal infectious arthritis, Still's disease, Felty's syndrome, and periarthritis.[2-6] I also include Marie-Strümpell disease in the rheumatoid arthritis category.

Rheumatoid arthritis is a systemic condition whose etiology is most complex and obscure. The constitutional features include fatigue, anorexia, malnutrition, vasomotor disturbance, muscular atrophy, anemia, and a rapid sedimentation rate.[2]

Joint involvement may start in any part of the body, but it is usually first noticed in the hands and wrists or in the feet and knees.[7] In the early stages there may be only slight twinges of pain and some early morning swelling which subsides with use of the joint. The symptoms may be entirely gone by afternoon. I should like to re-emphasize that the early stage is the most opportune time to examine the patient thoroughly and to begin corrective treatment.

Soon after the earliest symptoms are noted, there is a gradual increase in swelling. Pain is intensified, and joint involvement progresses to the shoulders, elbows, hips, or spine. Our experience at the Ottawa Arthritis Hospital has been that if the course of the disease is left unchecked, fibrous or bony ankylosis finally takes place, and the patient is permanently crippled in one or more joints.

It is our opinion that pathologic change at the onset is essentially that of inflammatory reaction of the joint synovia. This is followed by gradual involvement of the synovial sheaths of adjacent tendons and bursa. Effusions take place, and finally the total joint structure, including tissue, is involved. Fibrous adhesions form in the joint cavities. The cartilage is gradually destroyed, and ankylosis takes place.

The pathology of changes in the Marie-Strümpell type is somewhat different. Here the final result is calcification of the ligaments of the vertebra rather than destruction of the cartilage. Fibrous or bony ankylosis, as found in the rheumatoid joint, is not usually present.

The term "rheumatoid arthritis," then, can be said to apply to any acute arthritic condition in which there is joint swelling and pain.

We at Ottawa see too few patients with early rheumatoid arthritis. Most of our rheumatoid cases are already well established, with permanent changes having taken place in the bone structure as well as in tendons and bursa. However, even in these cases there is the possibility of restoring a degree of normalcy through proper application of osteopathic principles.

*Presented at the annual meeting of the American Osteopathic Society for the Study and Control of Rheumatic Diseases, Los Angeles, July 17, 1955.

OSTEOARTHRITIS

Osteoarthritis is synonymous with so-called degenerative arthritis, hypertrophic arthritis, and nonankylosing arthritis. Osteoarthritis also is a systemic condition whose etiology is so complex that most medical books class it as "unknown."

The pathology of osteoarthritis is a combined process of three principal factors:[2]

1. Degeneration of the cartilage
2. Deposits of calcium salts forming about the margins of the joints
3. Condensation and increased calcification in the bone immediately adjacent to the site of the degenerating cartilage.

The main clinical characteristics of osteoarthritis are its gradual onset and the lack of any evidence of acute inflammatory reaction in the joints and the surrounding tissues. Pain on motion of the joints, when it does occur in these cases, may be moderately severe, but there is very little pain if the joints are kept at rest. While the weight-bearing joints, such as the feet, knees, hips, and spine, are the joints most commonly involved, osteoarthritis may involve almost any joint in the body.

Because osteoarthritis is often found in weight-bearing joints, it has been suggested that excessive weight is an important factor in these cases. It should be remembered, however, that in a great many individuals, particularly in women, this form of arthritis starts in the terminal joints of the fingers. It is obvious that in these individuals neither weight bearing nor trauma can seriously be considered as a factor in the development of this condition.

ETIOLOGIC FACTORS IN THE ARTHRITIDES

After over two decades of experience, it is our opinion at Ottawa that there is little if any difference in the etiologic factors of rheumatoid arthritis and osteoarthritis. They are both systemic conditions producing marked crippling in the terminal stages.

There have been many theories advanced regarding the factors responsible for arthritis. It is said that the principal causes are focal infections, trauma, and the menopause. I cannot overemphasize my disagreement with these theories. While the fact must be accepted that these conditions do exist in patients seen in everyday practice, they are the exception rather than the rule. Infections and the menopause, when present, do add a load to an already depleted body system. They may be precipitating factors, "the straw that broke the camel's back." Trauma is a slightly different factor in that shock resulting from it may act as a depleting agent. It may also produce sufficient residual chronic inflammation or scar tissue which may be the original site of the arthritic involvement.

The menopause itself does not cause arthritis any more than age does. It is how the body ages that makes the difference. Millions of women go through the menopause without developing arthritis. Our contention has always been that if the above mentioned conditions were causes, there would be even more cases of arthritis than there are. Further, in relation to etiology, it is fortunate that the theory that infected teeth, tonsils, appendices, and gallbladders are almost always sources of arthritis has been almost discarded. The number of surgical wrecks who come to us for help after having undergone three, four, or five operations is appalling.

When there is a clear and definite understanding of the complex factors in arthritis, then it is possible to evaluate the necessity for comprehensive diagnosis and systemic treatment.

The majority of arthritis patients coming into our offices know they have arthritis. Joint deformity, swelling, pain, and stiffness tell them that. They seek advice to find out what can be done about it. After it has been determined why they have arthritis, we are in the best position to counsel and treat them. In order to determine why arthritis developed in any given case, possible combinations of the following factors should be considered: (1) inherited tendencies, (2) acquired abnormalities, (3) contributing factors, and (4) precipitating factors.

Inherited tendencies are established in the fetus, and acquired abnormalities are usually established before adulthood. Inherited tendencies should be considered because similar tendencies to ill health are often seen in parents and their children. Diabetes, hay fever, asthma, and other allergic conditions are all inherited tendencies which develop into activity during the process of aging. The same is true of arthritis. In most cases of arthritis a history of some degenerative disease has been found in one or both parents. However, the disease is not inherited, only the tendency.

Acquired abnormalities are residuals of acute childhood illnesses, poor health habits, or dietary indiscretions throughout the patient's lifetime. Every physician has had patients who still show the effects of the so-called self-limiting diseases of childhood. For example, a cardiac lesion may be the direct result of a streptococcic infection such as scarlet fever, or a parathyroid bacterial growth may have remained in the colon after 25 or 30 years. At age 50, Salmonella may still be present although the patient had apparently recovered from typhoid fever at the age of 25. However, it cannot be said that this patient had really recovered. His complaint may be of a stiff knee which has been bothering him for only a period of weeks or months, but his arthritis has been developing during the past 25 years because of this acquired depleting factor.

Acquired abnormalities also result from improper nutrition from childhood on. Too many children grow up disliking cereals, leafy vegetables, and protein foods necessary for normal growth and development and preferring sweets and other concentrated carbohydrates that result in systemic deficiencies. In spite of likes and dislikes, children should have a well-balanced diet and be educated in good dietary habits. Many patients today demonstrate dietary deficiencies. This should be investigated and corrected in the arthritic patient as a better-late-than-never measure.

Many adults today suffer from constipation and impaired gastrointestinal function without realizing their possible ill effects upon body metabolism. In other words, lifelong poor health habits develop into the acquired abnormalities of the arthritic. These should be evaluated in any case study in order to determine why the patient has arthritis. For the future health of our nation good health habits should be emphasized in pediatric practice.

In discussing diet as a factor in arthritis, I would like to suggest changing the old saying "We live by what we eat" to "We live by what we eat and assimilate." I believe diet should be predicated on the ability of the gastrointestinal tract to digest and eliminate rather than on the type and amount of food usually considered ideal.

Two other factors which may enter into the arthritic syndrome, namely, contributing factors and precipitating factors, must be considered. Contributing factors are conditions whose effects on the body gradually ac-

cumulate. They may consist of any one or a combination of the following or any factor tending further to reduce the reserve of body vitality:

1. Structural abnormalities and strains[8]
2. Abnormal functioning of the organic and endocrine systems[7]
3. Emotional or psychic stress[5]
4. Mental or physical fatigue.[5]

One serious depleting factor which occurs after the development of actual arthritis is pain. Pain severe enough to prevent rest and relaxation produces emotional and mental stress and is a major cause of constant lowering of the patient's vitality. When pain is controlled there is usually a noticeable improvement in the patient's general condition.

Any hypofunction or hyperfunction of the endocrine system or the organic system of the body will produce more than normal or less than normal quantities of hormones and nutrients in the blood stream. This factor must be considered in the patient's over-all health problem.

All of the systems of the body must also be considered: the structural, digestive, eliminative, circulatory, endocrine, and nervous systems. We as osteopathic physicians believe that normal health is a delicate balance between all these systems. When this balance is disturbed, ill health will result. The more severe the imbalance, the greater the degenerative involvement.

The autonomic nervous system with its sympathetic and parasympathetic components controls the vegetative functions of the body: the circulation of blood and lymph, the nutrition of all structures, and the activity of external and internal secreting glands.[6] Many patients have neuroglandular deficiencies and imbalances because of inheritance. These imbalances and deficiencies become more pronounced through the aging processes, and aging begins at the moment of birth. The arthritic grows old before his time, and many patients chronologically in their thirties may be physiologically aged 70 or 80. It is our experience that there is some dysfunction of the gastrointestinal tract, gallbladder, liver, kidneys, or endocrine system contributing to each arthritic case.

As osteopathic physicians we are all aware of the influence of structure on function. We have not as yet found a particular lesion pattern which produces arthritis, but postural deviations are found in all arthritic patients,[8] and as we have all been taught, these are contributing factors to abnormal health.

The precipitating factors which may excite arthritic involvement may be summarized as follows:

1. Mental or physical fatigue
2. Psychic or physiologic shock
3. Acute illnesses or other infections.

In discussing exciting factors we must first consider the many things which can happen to an already depleted body system which will precipitate the onset of arthritis. It is our contention that exciting factors will produce arthritis only in those who would have developed arthritis in later life, in other words, in individuals in whom the predisposition is present.

So many of our patients at Ottawa present a history of physical and mental fatigue from overwork, emotional stress, anxiety about money and employment, marital troubles, et cetera, that we believe these to be severe precipitating factors. These individuals have not lived within their own capacity, physically, mentally or emotionally. This adds insult to injury and results in an autonomic nervous system imbalance, placing additional stress and strain on the gastrointestinal tract, liver, gallbladder, and the genitourinary and cardiovascular systems.

The emotional shock of the loss of someone near or dear is an exciting factor. As an illustration, I recall a patient whose husband was killed in an automobile accident. Within 3 days this patient was incapacitated with acute rheumatoid arthritis involving most of the extremities.[7] The physiologic strain or shock of delivery in the obstetric patient is often an exciting factor. Surgical shock is another.[5] Stress and strain due to extreme heat or cold or sudden temperature changes can cause physiologic shock.[5] Traumatic shock must also be classed as an exciting factor. Traumatic injury sometimes leaves residual scar tissue in a joint which may be the point of original involvement at the onset of the arthritis.

The depleting effects of pneumonia, influenza, streptococcic infections, typhoid fever, malaria, and other illnesses can produce severe drain on the general vitality of the patient and must be considered as precipitating factors. Infected teeth, tonsils, venereal disease, undulant fever, kidney and prostatic infections, and pelvic and rectal disease must also be classed as precipitating factors.

It will be difficult in many cases to differentiate between contributing and precipitating factors because they are often closely related. However, in the evaluation of an individual case this differentiation is important because it will determine the factor which must be treated first. For example, if the patient is an incipient arthritic starting the menopause, other things being equal, the endocrine problem in her case might be considered the exciting factor of the arthritic syndrome. However, endocrine treatment alone will not suffice; it must be remembered that the physiologic shock of the menopause superimposed upon an already depleted body produced the arthritic syndrome. The same holds true of so-called infectious and traumatic arthritis.

CONCLUSION

In conclusion, I should like to emphasize that to treat arthritis successfully it must be understood that the patient's heredity and environment are the first factors in the development of the arthritic syndrome. Added to this are the contributing or depleting factors to which the individual has been subjected throughout his lifetime. Then, when the exciting factor presents itself, the metabolic systems of the body are receptive and the patient develops arthritis.

The etiologic factors which preceded the joint involvement must be kept in mind. The patient does not have "just" arthritis, and administration of a powerful stimulant such as cortisone or Meticorten is not the answer; instead, all factors, the causes and effects and the patient as a whole, must be treated.

REFERENCES

1. Gardner, H. L.: Unitary conception of disease. J. Am. Osteop. A. 47:205-206, Dec. 1947.
2. Bach, T. F., ed.: Arthritis and related conditions. F. A. Davis Co., Philadelphia, 1947.
3. Steinbrocker, O.: Arthritis in modern medicine. W. B. Saunders Co., Philadelphia, 1941.
4. Hollander, J. L., ed.: Comroe's Arthritis. Ed. 5. Lea & Febiger, Philadelphia, 1953.
5. Selye, H.: Physiology and pathology of exposure to stress. Acta, Montreal, 1950.
6. Traut, E. F.: Rheumatic diseases. C. V. Mosby Co., St. Louis, 1952.
7. Ottawa Arthritis Hospital and Diagnostic Clinic: Case histories.
8. Cole, W. V.: Structural relationship and patterns in arthritis; preliminary report based on evaluation of 500 case histories. Unpublished paper.

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Fatal Congenital Pulmonary Artery Stenosis With Interatrial Shunt

Some Considerations and Report of a Case*

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HISTORY AND REVIEW

Pulmonary stenosis with an intact interventricular septum has become recognized in recent years as one of the more common cardiac malformations. The clinical and physiologic features of this disease have been observed in large groups by several investigators.[1-5] The diagnosis has been proved by cardiac catheterization, angiocardiography, and at autopsy.

Congenital pulmonary stenosis presents a clinical picture which has been established chiefly from observations on older children and adults. The infantile type differs substantially from that seen in the older patient. In the older child, the symptomatology consists mainly of fatigue, exertional dyspnea, and cyanosis. All patients have a characteristic systolic murmur accompanied by a thrill and a diminished pulmonic closure. Right ventricular hypertrophy is usually demonstrated on the electrocardiogram. The radiologic picture is characterized by right ventricular enlargement, a prominent pulmonary arterial segment, and diminished pulmonary vasculature. These findings were reported by Nadas and coworkers[1] from a summary of forty-six patients in whom the diagnosis was proved by cardiac catheterization in forty-one instances and by angiocardiography in two. In the remaining three patients the diagnosis was made at autopsy. These patients ranged from 3½ to 21 years of age.

Pulmonary stenosis in infancy presents an emergency. The clinical picture is usually one of an extreme degree of stenosis with marked hypertrophy of the right ventricle and congestive heart failure. This type has been classified by Nadas and his associates[1] as a "malignant" group. Gibson and his associates[2] have reported forty-five cases believed to be pulmonary stenosis with an intact interventricular septum. In ten patients, the diagnosis was proved at autopsy. Thirty-five patients were submitted to pulmonary valvulotomy; one death occurred, and in this case diagnosis was confirmed at autopsy. They emphasize the fulminating nature of these severe cases in which death may occur more or less suddenly within the first few days or weeks of life.

The symptomatology is variable, depending upon the severity of the pulmonary stenosis and the presence and degree of shunting of blood from right to left through an open foramen ovale.[2] Cyanosis and paroxysmal dyspnea occur in early infancy in the more severe cases. Physical examination reveals marked cardiac enlargement and a systolic murmur of variable intensity, usually best heard at the base of the heart, which may be accompanied by a thrill. This murmur has been described as a "slatting-sail" sound and occurs as the pulmonary orifice is snapped taut with systole.[6] The pulmonic second sound is greatly reduced and may even be absent as the pressure in the pulmonary artery is low. The radiologic picture is characterized by cardiac enlargement involving the right auricle and right ventricle. The pulmonary segment is prominent, and the lung fields are abnormally clear. The electrocardiograph usually reveals evidence of right axis deviation. Right heart strain with tall peaked P-waves is particularly noticeable in lead II.[2] Cardiac catheterization generally reveals a high pressure in the right ventricle which may be much higher than that in the systemic circulation. A low pressure past the stenosis is observed in the pulmonary artery. Peripheral arterial oxygen saturation is diminished, thus establishing the diagnosis of a right to left shunt.[7]

The most unique feature of this condition is the monotonous uniformity in the architecture of the pulmonary valve. There is a conical fusion of the three valve cusps, resulting in a small central opening.[2] In systole, this malformed valve protrudes like a dome into the pulmonary artery. There is also a characteristic poststenotic dilatation of the pulmonary artery, possibly due to the stagnation of blood. Recent advances in angiocardiography have made possible visualization of these findings before death. Right oblique or lateral views best demonstrate the valvular stenosis and poststenotic dilatation.[7] The left atrium may be seen early as the dye enters it from the right atrium. The dye usually persists in the pulmonary artery for many seconds.

The most frequent defect with pulmonary stenosis is tetralogy of Fallot in conjunction with a defect of the ventricular septum, over-riding of the aorta, and hypertrophy of the right ventricle. In this syndrome, stenosis always involves the infundibulum of the right ventricle. The pulmonary valve may be normal. Infundibular stenosis occurs because of the hypertrophy of the crista supraventricularis, which divides the right ventricle and forms a third ventricle. If the stenosis is low in the right ventricle, a large infundibular chamber or third ventricle is formed. The nearer the stenosis to the pulmonary valve, the smaller the third ventricle[8] (Figs. 1 to 3).

When the stenosis is valvular and the interventricular septum is intact, there is no over-riding of the aorta. However, there does occur a right to left shunt through the foramen ovale which may have remained open or has been forced open by increased pressure on the right side of the heart. The characteristic appearance of the domelike structure of the pulmonary valve and the poststenotic dilatation of the pulmonary artery

*This paper was presented in part by Dr. Teplitz at the annual meeting of the American College of Osteopathic Pediatricians, Los Angeles, July 15, 1955.

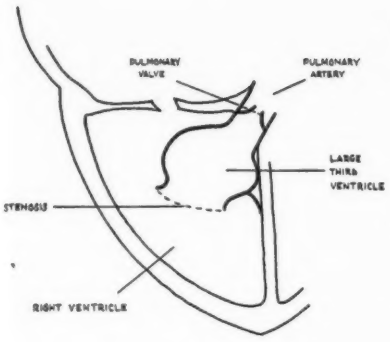


Fig. 1

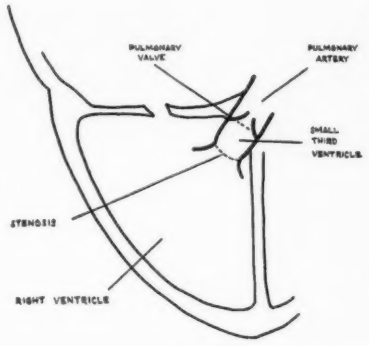


Fig. 2

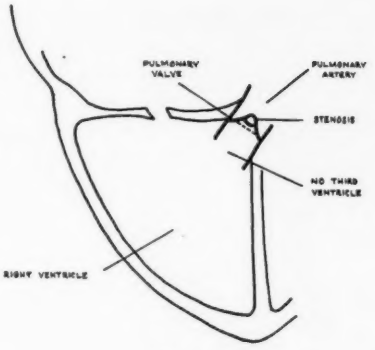


Fig. 3

immediately distal to the valve offer a sharp contrast to the findings in tetralogy of Fallot.

The prognosis of congenital pulmonary stenosis with an intact interventricular septum and extreme narrowing of the pulmonary valve in infancy is usually very grave. Life can be maintained for only a few days or weeks unless the condition is surgically relieved. This condition constitutes a state of emergency, and surgery is generally accompanied by a very high mortality rate.

Surgical intervention in the form of pulmonary valvulotomy as developed by Brock is the procedure of choice.[2] Insofar as the infundibulum is normal, the pulmonary orifice is accessible. Gibson and his coworkers[2] have reported thirty-five patients submitted to pulmonary valvulotomy with one death. The results have been most spectacular. With opening of the pulmonary valve, cyanosis disappears and cardiac rhythm returns to normal. Convalescence has been reported as uneventful.

Surgery is indicated in patients with pulmonary stenosis with intact interventricular septum when there is increasing strain on the right ventricle. Right ventricular pressure of 100 mm. of mercury or more is now considered the critical level for surgical intervention. Cardiac catheterizations, serial electrocardiographic tracings, angiocardiography, and careful appraisal of the clinical findings have opened the doors to many advances in this new field.

The first case of pulmonary stenosis with a patent foramen ovale and intact interventricular septum was reported about 100 years ago by Thomas B. Peacock.[9] Maude Abbott's[4] pioneering study of congenital heart disease has revealed sixteen cases of pulmonary stenosis with an intact ventricular septum and an additional nine cases in which both the septums were closed. These cases were reported in her analysis of 1,000 cases of congenital heart disease. The results were in sharp contrast to the eighty-five cases of pulmonary stenosis associated with defects of the interventricular septum. In some pediatric circles it is generally assumed that cases showing pulmonary stenosis and right ventricular hypertrophy are examples of the commoner tetralogy of Fallot, while little consideration is given to the possibility of uncomplicated pulmonary stenosis.

CASE PRESENTATION

A 32-year-old white multipara became pregnant in the first week of December, 1953. This was her second pregnancy, the first having been terminated by an induced abortion without indication 3 years before. She denied any attempts to abort this pregnancy. Later that month she had consulted a physician in another city because of persistent nausea. On December 22 and 23 the patient had been examined radiologically. A single chest film and a gastrointestinal series, consisting of fluoroscopy and nine radiographs following administration of a barium enema, had been made. An Aschheim-Zondek test was positive on January 5, 1954.

When she presented herself for examination in February, 1954, a history of diphtheria, "measles," and other childhood diseases was elicited. A questionable history of undulant fever was given. Cervical dilatation for dysmenorrhea had been performed in July, 1953, and tissue for endometrial biopsy at that time had been identified as "secretory endometrium."

Physical examination revealed a well-developed, well-nourished female in good health who was happy, but somewhat fearful of the "ordeal of delivery." Her uterus was thought to contain a fetus of approximately the eighth week of pregnancy. Laboratory examination revealed: hemoglobin 12.1 grams, erythrocytes 3,850,000, leukocytes 6,500 with a normal differential, Rh positive (anti-D). Urinalysis showed no significant findings.

The subsequent course of pregnancy was completely uneventful. Shortly before term cephalopelvimetry was performed. The fetus was reported to be at full term, and the pelvis was reported as a mixed gynecoid-anthropoid type, ample in all planes.

Labor began spontaneously and was uncomplicated. The fetal heart rate was consistently 160 per minute. Caudal analgesia was employed. Delivery was complicated by a midplane arrest of the fetus in a right occiput posterior position, and forceps extraction was effected with some difficulty. However, the cry of the newborn was immediate and lusty, and the skin soon became pink in color. The infant was a boy weighing 7 pounds, 3 ounces.

Twelve hours after delivery the baby was noted to be mildly cyanotic. A large amount of brown-tinged mucus was suctioned from his mouth and throat, after which there was some slight improvement in his color. Orthopnea was not noted, and his cry was reported as good. Shortly thereafter he became more deeply cyanotic and was then placed in an incubator in which he received oxygen through an Alevaire mist at 5 liters per minute. This measure failed to improve the boy's color.

Examination 14 hours after delivery revealed a mildly cyanotic, orthopneic male newborn who became more cyanotic when he cried. A small skin laceration at the lateral canthus of the left eye and periorbital

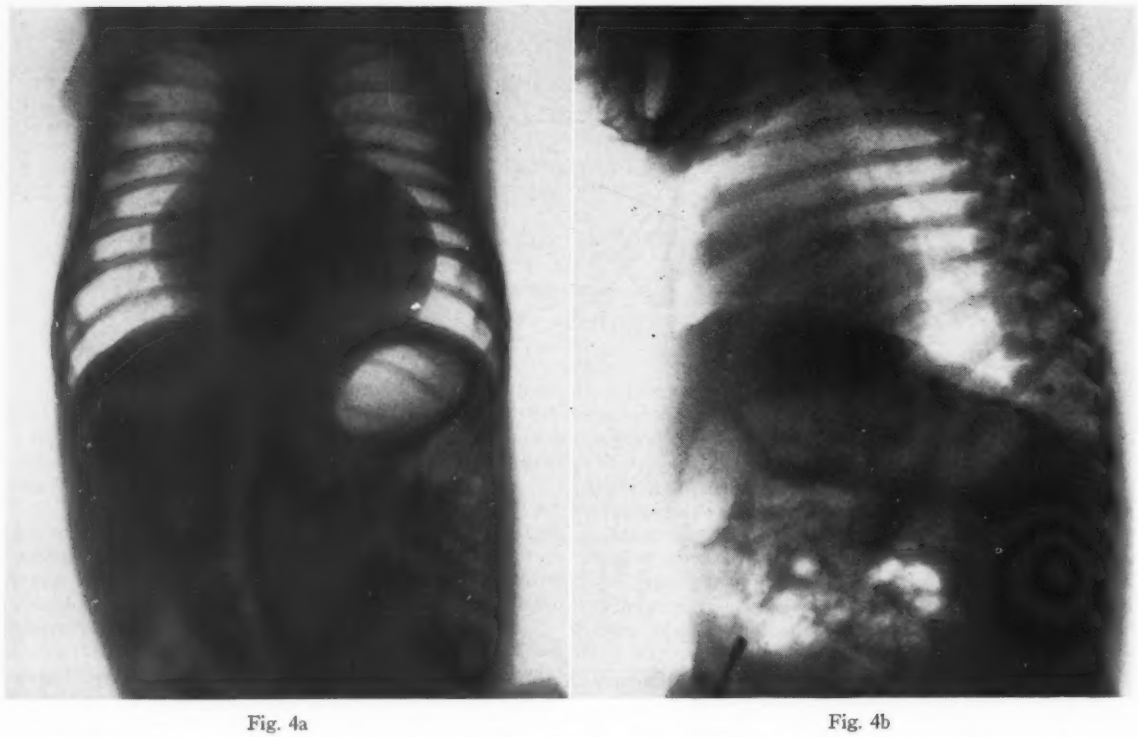


Fig. 4a Fig. 4b

Fig. 4a. Anteroposterior view shows the globular aspect of the heart, the increase in lateral diameter, and pulmonary hypovascularity. Fig. 4b. Lateral view emphasizes the enlargement of the cardiac shadow.

edema were noted. The fontanels were normotensive and the Moro reflex was physiologic. Tachypnea was present, and retraction of the intercostal spaces was noted on inspiration. Percussion of the cardiac borders revealed the apex to be lateral to the midclavicular line. A grade II systolic murmur was heard, with its point of maximum intensity in the third interspace at the left lateral sternal border, which was transmitted to the xyphoid and the sternum. The second pulmonic sound was present but diminished in volume. Rales were not elicited. The liver was enlarged to approximately 3 cm. below the right costal girdle. Arterial pulsations were present in both the upper and lower extremities.

X-ray of the chest revealed pulmonary fields that were clear and somewhat hyper-radiable, with what appeared to be diminution of vascular markings to the lung parenchyma. The heart had a globular configuration and appeared to be slightly enlarged in the transverse diameter, both in the posteroanterior and lateral views (Figs. 4a and 4b).

Electrocardiographic examination showed: auricular rate, 160; ventricular rate, 160; PR interval, 0.12; rhythm, sinus; QRS interval, 0.06; position, semivertical; deep S waves in lead I; increased amplitude of Q

Fig. 5

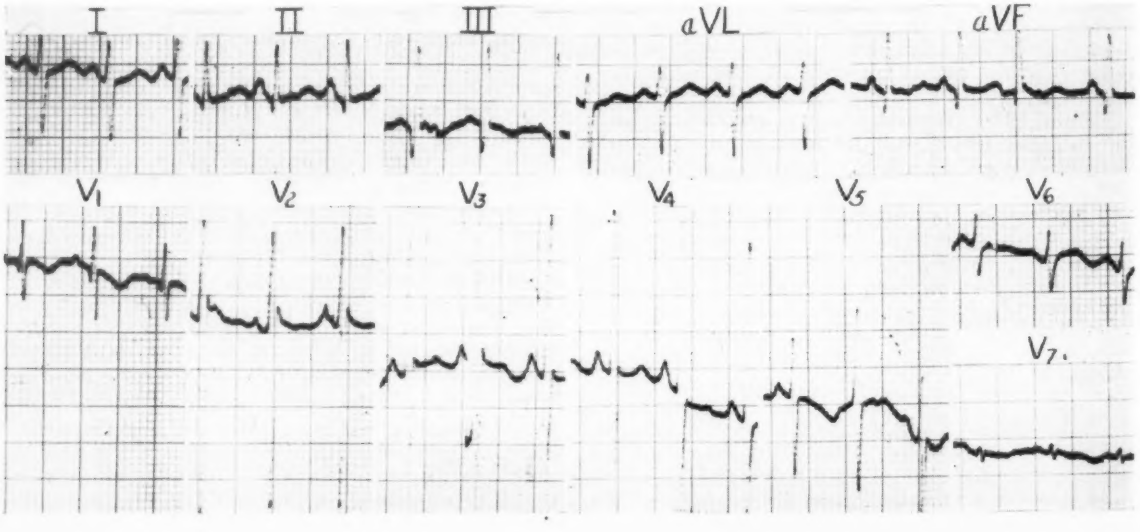


Fig. 6. Note the fused leaflets of the pulmonic valve and the diminutive orifice from which the tip of an ordinary paper clip protrudes. The opened aorta is to the left.

waves and deep S waves over right precordium; notable S waves in V_4, V_5, and V_6 (Fig. 5).

The conclusion was right ventricular enlargement.

Despite rapid digitalization and other therapeutic measures, the infant's condition deteriorated rapidly. There was progressive enlargement of the liver, cyanosis became more profound, and Cheyne-Stokes respirations ensued. The baby expired 42 hours after birth.

DISCUSSION

The literature has well established the relationship of congenital cardiac lesions to the occurrence of German measles in the mother in the first trimester of pregnancy.[10-13] Our patient developed immunity to this disease in childhood. While she did give a history of having been exposed to exanthem subitum in the last trimester of pregnancy, she did not remember having been exposed to German measles. This point is made since there are reports of babies with major congenital defects born to mothers exposed to German measles early in pregnancy but not overtly infected.[14] Production of major congenital anomalies, such as meningocele and cranioschisis, in chick embryos by the injection of lead nitrate into the albumin of fertile eggs has been demonstrated.[15] Our patient, however, did not ingest lead or other heavy metals.

Exposure of the mother to irradiation must also be considered as a possible factor in the genesis of the congenital cardiac lesion. The embryologic development of the heart begins in the third week following fertilization,[16] and it was in this critical period that x-ray studies were made of her abdomen and pelvis. It is generally known that the more immature the fetus the greater is the hazard of tissue damage by irradiation.[17] For this reason, many authorities advise against any irradiation to or near the pelvis of a female in the first trimester of pregnancy.

ANATOMIC AND FUNCTIONAL PATHOLOGY

The outstanding and most important changes, of course, were to be found in the infant's heart. Secondary changes, particularly in the lungs, were also present. The lumen in the pulmonary artery at the valve leaflets measured just 1.0 mm. (Fig. 6). The means of stenosis was by fusion of the leaflets along their ordinarily free margins up to the commissures. Since these develop in separate pads of endocardial tissue at the truncus conus junction[18] and usually remain distinct, this is not a lesion of developmental arrest. It represents, instead, anomalous growth which conceivably might be due to disruption of the usual controlling factors. For hydrodynamic reasons the lesion probably occurs late in embryonic (not fetal) life,[19] in sufficient time to permit great changes to occur in the presence of severe stenosis, as this case illustrates. Taussig[20] disagrees that increased work of the heart occurs in intrauterine life, but admits that her experience with the lesion is limited. The findings in this instance, however, speak for themselves. Such deviation has been connected to various infective states, as in virus diseases[20-23] and toxicoses as induced by heavy metals.[15] Hereditary factors, long presumed definitely established, are thereby questioned. However, Herndon[23] stresses the point that sensitivity to toxic agents may be hereditary and in this manner contribute to the development of congenital malformations. Statistics presented in favor of hereditary causes are unconvincing on any other basis.

Caudad to the point of stenosis, bulbous hypertrophy of the right ventricular wall (Figs. 7 and 8) at the conus occurred. This site received the first impact of resistance of blood flow. Transmission of the load next appears in the right ventricle, which showed marked hypertrophy for this age group. Left ventricular hypertrophy was present and interpreted as follows: Vascular resistance is continued, in this lesion, from the right ventricle to the atrium. At this point, a number of possible relief mechanisms are available. The viscera drained by the superior vena cava do not easily or usually tolerate passive congestion, but those drained by the inferior vena cava are much more accommodating, the liver commonly acting as a fluid reservoir. A third path is possible, and this is through the patent foramen ovale. If this were operative, one would expect a wide foramen and left atrial and ventricular hypertrophy. These expectations were fulfilled by the

Fig. 7. Note bulging infundibular segment of right ventricle.

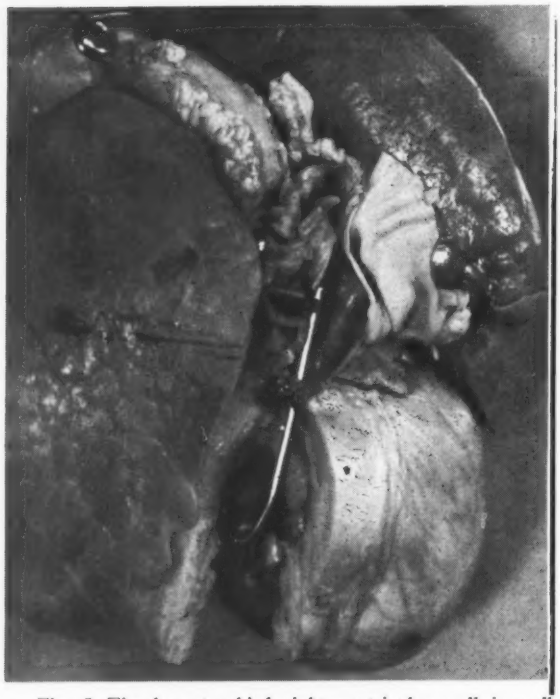


Fig. 8. The hypertrophied right ventricular wall is well demonstrated in this photograph. The clip passes from the right ventricle, through the unopened pulmonic valve and presents in the pulmonary artery. (Ordinary objects, paper clips and safety pins, were selected to demonstrate relative sizes.)

findings, and there was marked fenestration (Fig. 9) of the membranous leaf of the foramen, suggesting long-standing and severe hydrodynamic pressures.

The ductus arteriosus was widely patent, but the diameter of the vessel in no way indicated pathologic pressures within it. Any importance in the consideration of the artery at this time is initiated by a consideration of possible blood routes to the lungs. Flow through the pulmonary artery beyond the valve was highly improbable to any significant degree and during fetal life cannot be construed as being of prime importance. However, on a hydrodynamic basis alone, reduced pressure in the pulmonary artery may have permitted the regurgitation of blood from the aorta, through the ductus, and thence into the lungs. This would provide an additional source of blood through the pulmonary artery and increases in the amount of potentially oxygenated blood (Figs. 10-13). Well-authenticated evidence to support this concept has been documented.[24]

Hypovascularity of the lungs is to be regarded as inimical to the condition despite all tributaries. This was confirmed radiologically and on gross and microscopic examination of the lungs.

These observations are applicable only to severe cases of pulmonary stenosis affecting the valve. The general lesion, regarded formerly as extremely rare, has recently been re-evaluated and the conclusions drawn indicate a surprising frequency, almost banality.[25-28] The findings are being confirmed, and it has been pointed out that the severity of the lesion is quite variable with consequent differing life spans. In this paper, we are primarily concerned with almost total absence of a valvular orifice, rendering the need for proper diagnosis of extreme importance. The clinical, laboratory, and radiologic criteria must be clearly worked out so that the condition can be promptly recognized and immediate therapy instituted.

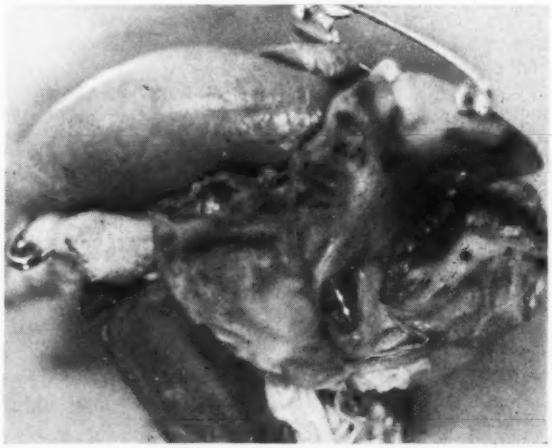
Another step in such a procedure is to trace the probable course of oxygenation of the blood and to test these suppositions by investigation. Restricting ourselves exclusively to the degree of stenosis characterized in this case, we should expect certain generalities to hold true. As we trace the blood flow above, decreased oxygen tension in chambers of the left heart should be present because of the admixture with venous blood spilling into the left atrium through the foramen ovale (assuming its patency). The flow can be regarded as occurring from right to left in stenosis of great degree. Appearing as it does in intrauterine existence, the lesion should almost always be associated with an open foramen ovale, possibly enlarged, in which case it may be interpreted as an interatrial septal defect.

Arterial hypoxygenation may be predicted for the systemic circulation. Estimation of the venous oxygen status in the peripheral routes is more difficult of precise evaluation. It may be normal if cellular activity or activity of the infant as a whole is depressed. However, barring this, the venous blood will probably show decreased oxygen content by virtue of decrease in the arterial supply. The lowered tension should reach a maximum in the right ventricle. The pulmonary artery, since it is the recipient of arterial blood from the ductus arteriosus, will demonstrate a comparatively elevated oxygen level, depending on the extent of such combination. In the pulmonary vein, blood should be fully oxygenated, provided no respiratory or hematologic abnormalities exist.

CLINICAL RESULTS

Data regarding the status of oxygen tensions in the process confirm the expectations noted.[26,28,29] Characteristic pressure changes are a marked differential between pulmonary artery (low) and right ventricular (high) findings with a sharp change at the site of obstruction. Pulmonary vascularity is decreased, when pure stenosis or pulmonary stenosis with right-left shunt (interatrial) exists.[24,26-29] However, in left to right shunt, as may occur in slight to moderate stenosis (rarely at rest, more likely with exercise), pulmonary vascularity is increased[28] and serves as a differential point regarding direction of the shunt. Shunts are

Fig. 9. The rounded end of a paper clip protrudes from the patent foramen ovale. Note the fenestrations.



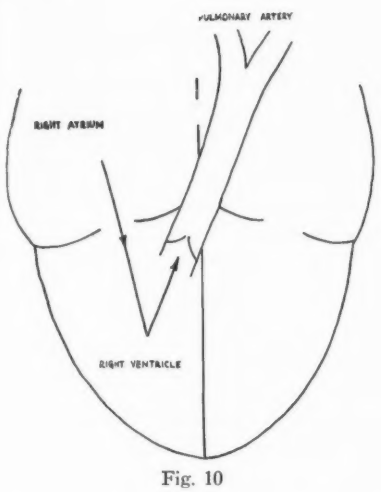


Fig. 10

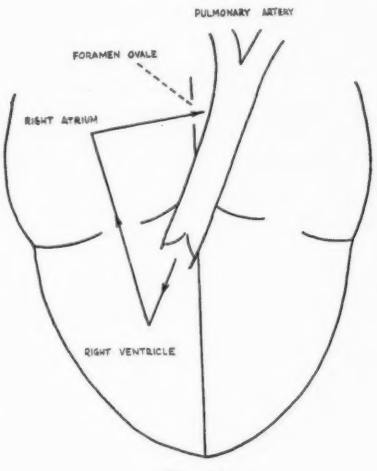


Fig. 11

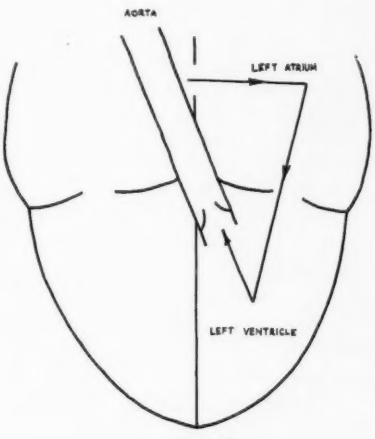


Fig. 12

rarely purely in one direction, as emphasized by Grossman,[30] and something less than ideal findings for oxygen content should be present in the statistics developed. However, evidence of bidirectional movement of blood is usually not apparent. The physiologic status of the individual probably plays a large part in determining the essential or predominant flow at any one time and may serve as partial explanation for the uniformity of data. Angiocardiography demarcates the lesion, gives some estimate of its size, and rules out tetralogy of Fallot, with which the lesion is frequently confused. Fluorescin circulation times (hand to face) may not always be helpful because of bidirectional shunts. This point is not often appreciated, and the supposed usefulness of the technic may be overemphasized. The degree of stenosis is fundamental in producing increased right ventricular pressure and in directing the course of the shunt flow. If the pulmonic valve and the pulmonary arterial resistances result in a total greater than the systemic systolic, then the shunt is from right to left. If the pressure developed in the right ventricle is less than in the left ventricle, the flow is from left to right. A correlation between the degree of resistance (severity of the stenosis), right ventricular pressure, and the direction of the shunt exists and is of basic import.

As Edwards[24] indicates, the combination of pulmonic stenosis, patent foramen ovale (interatrial septal defect), and patent ductus arteriosus produces a functional state in which the heart is essentially three-chambered. The left ventricle is the common chamber, being responsible for the systemic (through the aorta) as well as the pulmonary (through the patent ductus arteriosus) circulation.

In the case reported, the degree of stenosis was so great that virtual atresia existed. The load of the right ventricle is obvious. The left ventricle is concerned, therefore, with overcoming both systemic and pulmonary resistances and with handling an increased amount of blood. This was operative for months in intrauterine life, but labor and extrauterine existence were not compatible with continued function, and cardiac failure, predominantly right-sided, is presumed the pathophysiologic cause of death. Speculation regarding the precise factors involved in the interpretations of the fatal mechanisms should be recognized as purely hypothetical, involving many phenomena, both respiratory and cardiac.

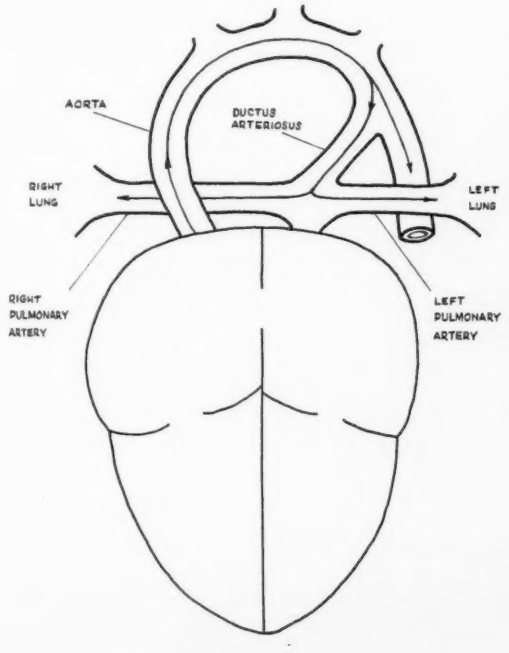
ASSOCIATED PATHOLOGIC CHANGES

Lack of pulmonary vascular markings has already been noted. The only persistent change inimical to this condition is visceral congestion behind the right heart. Hemopoiesis is usually seen in the liver and spleen of newborns and is not interpreted as being excessive in this, even with undeniable hypoxia. Fatty metamorphosis of the liver is also of doubtful relationship to the reduced pulmonary circulation and is certainly an integral part of passive congestion of the liver. The operational mechanisms are those of the adult.

SUMMARY AND CONCLUSIONS

A case of fatal congenital pulmonary artery stenosis (severe) with patent foramen ovale has been presented in detail. Hydrodynamics, oxygen tensions, and anatomic changes have been traced and identified as functions of altered physiology in relation to the exciting lesion.

Fig. 13



The salient features for clinical detection include:

1. Increasing cyanosis
2. Cardiac enlargement (x-ray), predominantly right-sided
3. Systolic murmur in the pulmonic area, accompanied by a thrill
4. Electrocardiographic evidence of right ventricular preponderance
5. Systemic hypoxygenation
6. Pulmonary oxygen tension greater than in the right ventricle
7. Obstructive lesion demonstrated by cardiac catheterization and/or angiocardiography.

Outstanding results may be expected with pulmonic valvulotomy.

1721 Griffin Ave.

REFERENCES

1. Nadas, A. S., *et al.*: Congenital pulmonic stenosis with intact ventricular septum. Transactions of Society for Pediatric Research, Am. J. Dis. Child. 88:806, Dec. 1954.
2. Gibson, S., *et al.*: Congenital pulmonary stenosis with intact ventricular septum. Am. J. Dis. Child. 87:26-39, Jan. 1954.
3. Brown, D. V., and McCollum, W. T.: Congenital pulmonary stenosis with intact interventricular septum. Am. J. Dis. Child. 80:792-799, Nov. 1950.
4. Abbott, M. E.: Atlas of congenital cardiac disease. American Heart Association, New York, 1936.
5. Edwards, J. E., *et al:* Atlas of congenital anomalies of heart and great vessels. Charles C Thomas, Springfield, Ill., 1954.
6. Dow, J. W., and Alimurung, M. N.: "Slatting-sail sign" of pulmonic stenosis. Southwestern Med. 36:72, Feb. 1955.
7. Gasul, B. M., *et al.*: Angiocardiography in congenital heart disease correlated with clinical and autopsy findings; 5-year clinical and pathological study of 34 cases in infants and young children out of series of 1100 patients, and 425 angiocardiograms. Am. J. Dis. Child, 85:404-443, April 1953.
9. Peacock, T. B.: On malformations of human heart. Ed. 2. J. Churchill and Sons, London, 1866.
10. Swan, C.: Rubella in pregnancy as aetiological factor in congenital malformation, stillbirth, miscarriage and abortion. J. Obst. & Gynaec. Brit. Emp. 56:341-363, June 1949.
11. Swan, C., Tostevin, A. L., and Black, G. H. B.: Final observations on congenital defects in infants following infectious diseases during pregnancy, with special reference to rubella. M. J. Australia 2:889-908, Dec. 1946.
12. Gregg, N. M.: Rubella during pregnancy of mother with its sequelae of congenital defects in child. M. J. Australia 1:313-315, March 31, 1945.
13. Miller, H. C., *et al.*: Special Report from Committee for Study of Congenital Malformations of American Academy of Pediatrics; study of relation of congenital malformations to maternal rubella and other infections; preliminary report. Pediatrics 3:259-270, Feb. 1949.
14. Dumont, M.: Role des maladies infectieuses sans atteinte apparente de la mère dans l'étiologie des malformations congénitales. Presse med. 62:116, Jan. 27, 1954.
15. Butt, E. M., Pearson, H. E., and Simonson, D. G.: Production of meningoceles and cranioschisis in chick embryos with lead nitrate. Proc. Soc. Exper. Biol. & Med. 79:247-249, Feb. 1952.
16. Potter, L.: Pathology of fetus and newborn. Year Book Publishers, Chicago, 1952.
17. Swenson, P. C.: Queries and Minor Notes: Roentgenographic studies during pregnancy. J. Am. M. A. 151:1054, March 21, 1953.
18. Patten, B. M.: Human embryology. Blakiston Co., Philadelphia, 1946.
19. Gould, S. E., ed.: Pathology of heart. Charles C Thomas, Springfield, Ill., 1953.
20. Taussig, H. B.: Congenital malformations of heart. Commonwealth Fund, New York, 1947.
21. Lucchesi, P. F., La Boccetta, A. G., and Peale, A. R.: Varicella neonatorum. Am. J. Dis. Child. 73:44-54, Jan. 1947.
22. Lucchesi, P. F., and Peale, A. R.: Acute varicella complicated by congenital anomalies; report of case. Arch. Pediat. 59:277-284, May 1942.
23. Herndon, C. N.: Cardiovascular system, in Clinical genetics, edited by A. Sorsby. Butterworth & Co., London, 1953, pp. 435-445.
24. Edwards, J. E.: Functional pathology of congenital cardiac disease. Pediat. Clin. North America 1:13-49, Feb. 1954.
25. Galligan, J. J., Adams, F. H., and Jorgens, J.: Congenital pulmonary stenosis without cyanosis. J. Pediat. 41:562-571, Nov. 1952.
26. Adams, F. H., *et al.*: Congenital valvular pulmonary stenosis with or without interatrial communication; physiologic studies as diagnostic aids. J. Pediat. 38:431-441, April 1951.
27. Dow, J. W., *et al.*: Studies of congenital heart disease; uncomplicated pulmonic stenosis. Circulation 1:267-287, Feb. 1950.
28. Sobin, S. S., *et al.*: Pulmonary valvular stenosis with intact ventricular septum; isolated valvular stenosis and valvular stenosis associated with interatrial shunt. Am. Heart J. 48:416-432, Sept. 1954.
29. Gasul, B. M., and Marienfeld, C. J.: Clinical diagnosis of cyanotic types of congenital malformations of heart. Pediat. Clin. North America 1:131-146, Feb. 1954.
30. Grossman, N.: Personal communication.

ADDITIONAL REFERENCES

Lev, M.: Autopsy diagnosis of congenitally malformed hearts. Charles C Thomas, Springfield, Ill., 1953.

Morison, J. E.: Foetal and neonatal pathology. C. V. Mosby Co., St. Louis, 1952.

Needham, J.: Biochemistry and morphogenesis. Cambridge University Press, London, 1942.

Rudolph, A. M., Nadas, A. S., and Goodale, W. T.: Intracardiac left-to-right shunt with pulmonic stenosis. Am. Heart J. 48:808-816, Dec. 1954.

BIOCHEMICAL DETERMINANTS OF INFECTION

While there is no knowledge of the precise mechanisms by which latent infections can be converted into active disease, at least two of the possibilities that first come to mind appear to be ruled out. The activation of the infectious process does not seem to result from the loss by the host of specific protective immunity—humoral or cellular; thus the herpetic individual who develops fever blisters possesses in his serum neutralizing antibodies against the herpes virus. Nor does the provoking agent exert its effect through increasing the virulence of the potential pathogen, as shown by the following example. Normal guinea pigs inoculated with BCG do not develop progressive infection although living bacilli persist for long periods of time in their tissues. If however the animals are made to inhale silica dust, BCG tuberculosis develops with production of cavities at the site of the silicotic reaction and death often ensues. Yet, the bacilli recovered from the lesions are found to be just as attenuated in virulence as those originally injected into the guinea pig. It is apparent therefore that silicosis acts as a provoking agent of the tuberculous process, not by increasing the virulence of the BCG bacilli, but by paralyzing the resistance which the tissues of the guinea pig normally possess against these microorganisms.

Whatever the nature of the reactions through which provoking agents decrease the resistance of the host, either systemically or locally, one of their effects in all likelihood is to alter the physicochemical environment in the tissues involved. This in turn is bound to influence the severity of the disease since the multiplication and viability of microorganisms, as well as their toxic properties, are conditioned by the composition of the environment. In order to understand the role played in the evolution of the infectious process by changes in the physicochemical characteristics of the tissues, it would be necessary to have a precise knowledge of the conditions under which microorganisms find themselves in vivo. Unfortunately, very little is known in this regard.—Rene J. Dubos, M.D., *Bulletin of the New York Academy of Medicine,* January, 1955.

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THE SPECIALTY PROGRAM

Thomas J. Meyers, Ph.D., D.O., F.A.C.N.
Chairman, Advisory Board for Osteopathic Specialists
Pasadena, Calif.

Speaking before the Pasadena Osteopathic Society on November 17 of last year, Dr. Joseph O. Costello, a certified osteopathic specialist in peripheral vascular diseases, stated that arteriosclerotic occlusion of the vessels of the legs is alarmingly widespread, but at the same time he emphasized that the incidence is not greatly different from that which existed 20 or possibly 50 or 100 years ago. Today, however, many more people live to old age, and arteriosclerosis is an illness of the later years of life. Further, many more cases are diagnosed because of the skills of specialists in the field of peripheral vascular disease.

Dr. Costello's knowledge of this condition was acquired only by long and intensive study, by subjecting himself to an educational discipline which included, as he stated it, reading everything written on the subject; his skill was acquired only by restricting his area of practice. His efforts have made available to the profession a learning and a proficiency that are necessary for the adequate diagnostic and therapeutic handling of patients with peripheral vascular diseases.

What is true of Dr. Costello in his field is equally true of the other certified specialists in each of the eleven fields for which the profession has a certifying board. And each specialist depends on other members of the profession for recognition and support. The more highly trained and the more limited his field, the more the specialist is dependent upon the profession. In return he makes available to the profession and its patients his technical abilities and the store of his training and experience. The general level of efficiency and the excellence of osteopathic service are enhanced in proportion to the extent of this interchange.

Failure of the profession to use specialists' services is much like having money in the bank and refusing to acknowledge that it is there or to use it to buy food and clothing with which to live comfortably. Just as shortsightedly poor judgment in the latter instance may result in malnutrition and illness, so in the former, it may result in horse-and-buggy practice in this atomic age when patients are deserving of modern medical skills.

The Advisory Board for Osteopathic Specialists was established by the Board of Trustees of the American Osteopathic Association in 1939. Since then eleven specialties, some of which are subdivided, have been recognized and are functioning, with certified members in all parts of the United States. Also since that time the osteopathic profession has made strides in its development and growth that can only be described as phenomenal.

Our profession is not endowed financially; the sources open to state universities are not open to our colleges; and, with the exception of the Los Angeles County Osteopathic Hospital and some public support given to the Philadelphia Osteopathic Hospital and research grants from the federal government to all our colleges, osteopathic institutions do not have the benefit of tax monies. Yet we are building hospitals that cost millions; our colleges are operating on budgets that total three and four times the monies collected from students as tuition; our state associations employ full-time professional personnel; and our national association owns its own property and maintains a large staff. As a profession we are thinking in terms that far outdistance the concepts of 1939; we represent a complete school of practice with the arts, technics, equipment, research, and educational facilities to handle any medical or surgical problem arising in American life today.

One important factor in this growth has been the development of the specialty program within the profession. Included in the program, in addition to the certifying boards, are the teaching programs of the osteopathic specialty colleges, organizations which have grown in size and stature and which offer in their meetings and for publications presentations of the highest order. Approved specialty training centers are being developed in all parts of the country.

For this development, a performance appraisal gauge is provided by old-school specialists. There is an approximation of the work of doctors of osteopathy and doctors of medicine. They speak the same language, read the same journals and books, frequently belong to the same organizations, write papers for the same editors, and in some instances are trained under the same masters. However, the osteopathic specialist has an advantage over the old-school specialist, for he has received his basic medical indoctrination in an osteopathic college where the totality of the human organism is more pointedly emphasized and where he acquired an insight into the development of pathologies and procedures for their correction that are not taught by the older school of practice.

The performance of the D.O. specialist is not allowed any handicap rating or scoring—it must be as

good or better than that of the M.D. specialist. Potentially, it should be better, since the D.O.'s diagnostic and therapeutic armamentarium possesses enriched methods and technics. In the eyes of the public, to whom these nuances are unknown, the D.O. specialist must be what he claims to be, and he is expected to perform accordingly. If he does not, not only will he be criticized as an individual whose skills are not up to standard, but more than likely the osteopathic profession will also be held at fault. Such a situation permits no compromise, and the certification program of organized osteopathy is set up, insofar as is humanly possible, to prevent compromise.

Few states place a limit upon the services of the osteopathic physician—his duties do not stop short of life and death. Serious as is the obligation of any physician, that of the specialist is more than doubled. He assumes that of the referring doctor and thereby becomes answerable to both the doctor and his patient, as well as to a society which has accorded him peculiar privileges. This is the heart of the osteopathic specialty program, the worth of which rests with the judgment of the Board of Trustees of the American Osteopathic Association. For it is the Board that is the certifying agency of the profession, carrying the onus of responsibility that each individual specialist is what he claims to be and can and will perform accordingly.

Admittedly there is considerable rigidity in the structure of the program. The time and content requirements of training are perhaps rather inelastic. While this is not an ideal situation, it is the only way that the present stage of the program's development can be adequately handled. The rigidity is necessary, for it is a method of appraising the clinical training of the trainee which he must frequently secure from widely dispersed centers and from teachers who are idealistically motivated and give of their knowledge and clinical abundance at considerable sacrifice to themselves. The present rules give protection to all concerned—the patient, society, the physician, and the profession, and they provide a structure on which training centers are being built.

Gradually and with time, maturity and versatility will develop in the structure of our organizations, and with them will come a wealth of knowledge and clinical opportunities. It is possible to envisage that under ideal conditions the only requirement for certification of both osteopathic and medical specialists will be the candidate's ability to pass examinations representative of this maturity and versatility.

It is truly remarkable that our profession has been able to lift itself to its present level by its own bootstraps, for throughout the developmental period of the profession we have been segregated from official participation in institutions of higher medical learning, denied open association with scholars of the medical profession, and in some instances actually refused admission to medical libraries. Despite all this the osteopathic specialist has found access to the sources of information basic to the training of the medical specialist. Although this in itself is not adequate training, the osteopathic profession has been able to produce specialists whose services and teaching are of the highest order.

The profession at large should be more thoroughly apprised of the work of the men who have made the specialty program what it is today and of the far-reaching influences it has upon every osteopathic physician. The certified specialists merit the confidence and support of the profession. This support will enhance and implement an even greater development of our institutions and will generally strengthen our position in relation to the public health.

TEACHING OSTEOPATHIC TECHNIC

A meeting of importance to the osteopathic profession, and one of the most significant to osteopathic education in 2 decades, was held November 9 and 10, 1955, at the Des Moines Still College of Osteopathy and Surgery, an osteopathic center geographically convenient for those in attendance. The meeting was not known to the profession generally, not even to osteopathic leaders in fields other than education. In fact, the meeting had to be viewed in retrospect, its potentialities as actualities, before the fullness of its meaning could become known.

Although the Seminar was on the "Teaching of Osteopathic Technic," it was not limited merely to a procedure. Rather, the meeting was an exploration of the ground of osteopathic education, to the end that eventually its purpose and policy will be fully implemented. The Seminar was under the auspices of the A.O.A. Bureau of Professional Education and Colleges and was conceived as one of a series of similar seminars. A study of this meeting suggests that such a series could prove epochal, influencing the course of osteopathic education, and hence the nature of the profession, to a degree hitherto unknown. It was pointed out at the outset of the meeting that some 20 years had elapsed since a similar concerted study had been attempted.

The Seminar was set up to study "ways and means of developing and improving the teaching of manipulative technic," considered as a specific therapeutic modality. The question of a horizontal or a vertical development (that is, courses limited to 1 and 2 years or such instruction made a part of every college year) of the teaching program in principles and technics was not made a matter for formal discussion. Emphasis was laid, however, on a policy in which osteopathic principles and technics would be considered actually as basic science courses, *basic to and pervasive in all other courses.*

A constantly expanding medical curriculum, of which osteopathic principles and technics are a part, demanded an accounting as a time factor affecting students and as a teaching load upon a faculty. This dilemma was found to be directly tied up with the avowed breakdown of specific osteopathic teaching in the clinical years. Seminar members were agreed that there is no way by which the degree of breakdown could be ascertained, although they recognized that under present educational conditions a breakdown to a

greater or lesser degree is inevitable. Osteopathic education combines the contradictions occasioned by the nature of present-day medicine and of osteopathic medicine, and from these there is no escape. Hence, an osteopathic curriculum admittedly presents many peculiar, complex, and challenging questions in its attempt to produce osteopathic physicians. The pervasion of the osteopathic approach to health and disease into a 4-year program of professional education was admitted to be an issue requiring free and candid discussion and careful exploration by all concerned with the responsibility, and especially by the colleges jointly.

Members of the Seminar were confronted with a semantic difficulty—confusion in the usage of the terms "osteopathy" and "osteopathic treatment." Both were used synonomously with the term "manipulative treatment." And certainly in error. Among the recommendations made by the Seminar, one was that a study be made of terminology in osteopathic diagnosis and therapy. To this observer equally important is a semantic study of terms relating to medicine and osteopathy as professions, viewed historically, politically, and organizationally.

In both instances lists of acceptably defined terms would serve to create a uniformity of expression within the profession and, in the last mentioned instance, would make for better public relations through clearer statements in newspapers, magazines, and other avenues of communication.

The enigma arising out of specialization in osteopathic medicine when related to clinical teaching was discussed. In an official report on the Seminar, its Summary Committee stated that:

> . . . as desirable as it may be clinically to dissect patients for specialized areas of study, the point must come when the patient is reunited into the unity that is man. This poses an instructional problem from the student's standpoint and particularly from the standpoint of integrating osteopathic principles and manipulation into specialty practice. . . . The specialist in his own clinic (other than in the exceptional case) provides little practical training either in the application of osteopathic principles or in the use of manipulative therapy, despite the fact that clinical teachers recognize the importance of osteopathic principles and the value of manipulative technics. . . .

The worth of the Seminar is also revealed by a study of the "Recommendations" that grew out of the meeting, eighteen in number. The Seminar requested that its sponsoring body, the Bureau of Professional Education and Colleges, recommend to the A.O.A. Board of Trustees that the seminar program be continued, firsthand evidence of the value put upon the meeting by its participants. It was emphasized that a department of osteopathic principles and technics should have as its primary objective their permeation throughout the entire educational program of a given college. This objective accomplished would result in the strengths of vertical development in the first 2 years being combined with the strength of horizontal development in the last 2 years, that is, a confluence of the basic science period with the clinical study and practice period.

Recommendations were specifically directed toward methods of critically re-evaluating the processes of osteopathic education. These recommendations carried no implication that osteopathic education should be segregated from medical education; rather they pointed to a type of professional education in which distinctly osteopathic values would assume their proper relationship.

The Seminar revealed that the accomplishment of each osteopathic college could be greatly enriched through a continuing consultative study of the seminar type. If the teaching of osteopathic principles and technics is to become a truly orientative factor in osteopathic education and a determining influence in the osteopathic profession, such a continuing study is mandatory. It seems quite likely that the entire profession will be in accord, once this point of view is understood.

Each osteopathic college was fully represented and each showed a willingness to face frankly the problems presented and the intelligence to seek their solution. The Bureau of Professional Education and Colleges was represented by Dr. Robert B. Thomas, its chairman, and the following members: Drs. Allan A. Eggleston, George W. Northup, and Roy J. Harvey. President Edwin F. Peters and Dean John B. Shumaker of Des Moines Still College and Mr. Lawrence W. Mills, Director, A.O.A. Office of Education, were present for parts of the meeting. Dr. J. S. Denslow, Kirksville College, presided.

The Seminar seen in relationship to a profession that is clearly reorienting and revitalizing itself, should be viewed as but one aspect of a total movement under way. Other aspects are the continuing work of the Committee on Clinical Studies (which has been repeatedly referred to editorially in THE JOURNAL), the special meeting of the A.O.A. Board of Trustees to be held in Chicago in March, and the postgraduate opportunities offered during recent years by the Academy of Applied Osteopathy. While this body is not directly in the line of organized osteopathy, it is one whose members are acutely aware of practice problems in the field, as these relate themselves to principles and methods that are distinctly osteopathic in nature.

The important thing is that none of these aspects of osteopathic reorientation shall be permitted to segregate themselves and find their program stymied due to a failure in intraprofessional communication, or because their particular programs become narrow and provincial. The osteopathic profession dare not lose sight of an ideal which, achieved in part, has brought it thus far—a willingness to act in totality. Therein its strength still lies, a strength made possible by the profession's relative fewness in numbers. That strength must continue to be utilized to the full.

USES OF THE PAST

"Those who look with fear upon liquidation, absorption, amalgamation, etc., of osteopathy need only to review its past and clarify its present to take out fear for its future. . . . Those who do have fears . . . seem particularly unaware that osteopathy has come of age." With these words, the author of the special article, "Perspectives," which appears in the February FORUM challenges the osteopathic profession to look at its past factually and unemotionally, the better to understand

the fundamental and highly significant changes which it is undergoing and which point to its future. The author, Dr. Leon Page, has been a participant-observer as a student, teacher, writer, and physician of his profession's development for more than 38 years. In "Perspectives" he writes with as nearly a total objectivity as it is given to men to do who are largely a part of all that has been done. And he sets forth these perspectives unplossed, with confidence that the majority of osteopathic physicians see their profession as a mature body—in his own words, one that has "come of age."

The thoughtful reading of this paper will convince many that osteopathy has largely ceased to be a personal problem to its practitioners and their patients, as it was for many years of Dr. Page's professional lifetime. Readers will appreciate the fact that in ceasing to be a personal problem osteopathy has become a communal problem, just as medicine (its professional counterpart) has long been a communal problem. Thus osteopathy is no longer merely the peculiar, the particular, and the independent—independent in the sense of being totally isolated from medicine. Hence, osteopathy and its practitioners are now being called upon to assume a total social responsibility.

The message of Dr. Page is a call to evaluate the profession's activities today in the light of its historical setting. It means to this reader that the whole of osteopathic medicine must be re-examined *in perspective* to determine in what way its nature differs from the nature of old-school medicine. The basic purpose of osteopathy has been recently set forth both in THE JOURNAL and in THE FORUM as one for the reorientation of medicine, in which the word "medicine" has been used in its generic sense. If the reorientation of medicine can be staked out as the ground from which osteopathy should continue to move forward, then osteopathy's first obligation is to reorient itself. The blind cannot lead the blind. Perspective is a first step in reorientation.

First consideration is given in "Perspectives" to the man back of the cause, the country doctor responsible for osteopathic beginnings. For many years Andrew Taylor Still has been done a disservice, by his followers as well as his enemies. A second time within a year (the first was in the Cole study of osteopathic education) Still emerges in a brief sketch, not the charismatic figure, not a harmless but effective bonesetter, not a charlatan and quack, but an understandable and unique human being, animated by a spark of intuitive and creative genius. That is as far as Page goes in his appraisal, and wisely so. The time is yet to come—as THE JOURNAL has previously pointed out—for a full-length portrait. It is enough at present to see Still and osteopathy in their proper historical relationship. It is sufficient to appreciate that the very contradictions within Still's own thinking reveal him as possessing a mind too creative in its scope to be neatly packaged and labeled in the way that we have attempted to do for 60 years; consistency, smug complacency, and self-satisfaction characterize the followers of individuals of power and vision. The creative mind does not operate within the mold which we have set up for the founder of this profession. Osteopathy is either much more than any of us have conceived it to be, or it is no more than a better sort of medical aberration. An accurate appraisal of its founder is necessary to an understanding of osteopathy's historic destiny.

"Perspectives" will be found of special value to the third generation of osteopathic physicians, those who are less than 40 years of age, and to osteopathic students of today. Tomorrow these students will largely constitute the osteopathic profession, its fourth generation. Neither the third nor the fourth generation of D.O.'s wants to be (nor will they be) converted to anything. They want only the simple historical facts, contradictions and all, and the perspective that such facts afford. They can be trusted to form their own opinions and make their own judgments. Such are some of the "uses of the past and the purpose of perspective," as seen by the author of the February FORUM special article.

Notes and Comments

Cancer and the Law.—

Cancer does not develop from a single trauma, according to L. P. Wershub, M.D., writing in the *Journal of the International College of Surgeons* for November, 1955, under the title, "Medicolegal Aspects of Carcinoma of the Urinary Tract." Because of this and the consideration that the role of trauma in the production of cancer is an uncertain one in any case, the author contends that entirely too many "traumatic cancers" have been appearing in the medicolegal literature. He states that the average person tends to blame his present affliction on accidents or occupational diseases no matter how his problem may actually have come about.

The article emphasizes that once it is established that an accident has occurred "as a result of" or "arising out of" employment, it must be determined whether or not the injury or disease from which the patient is suffering is actually a result of employment or could have occurred outside of his occupational environment: the problem is whether the occupational environment was causative or only coincidental. Attempts at evaluation of casual relationship are further clouded by the legal tenet, *"In dubio pro laeso,"* which means, roughly, when in doubt, favor the injured. It is Dr. Wershub's opinion that this is unjust and that it is most unfair to give a verdict simply on the basis of sympathy.

Three postulates are given in the article to be applied to any case in which cancer is supposed to have arisen from trauma:

1. A definite description of the trauma at the time it was sustained should be given by the reporting surgeon.

2. Definite proof should be established by every possible means that no tumor existed at the site of injury before the trauma was sustained.

3. Definite indications should be present to show that a pathologic process was continuing at the site of the trauma until a malignant tumor appeared and could be positively diagnosed.

Even more confusing than the question of whether or not a trauma caused the appearance of a tumor is the problem of whether or not an existing tumor was aggravated by the trauma. The author feels that in compensation cases an award is justifiable in any such case where there is any doubt or when complications have arisen that would not have done so in the absence of the injury.

Attention is also called to the tendency of tumors to remain latent for prolonged periods and thus remain unrecognized. They may come to recognition following an accident when a simple injury that ordinarily would produce little or no symptomatology may cause considerable trouble because of inflammation already present in the tumor or because the tumor has a tendency to hemorrhage easily.

Ewing is quoted as having said, "Traumas reveal more malignant tumors than they cause," and Pack is noted as having commented that such cases present "a strange paradox that injury to a part of the body containing an unknown tumor may be an accident beneficial to the patient, as it sometimes leads to the discovery of the tumor at a time when cure is still possible." Because of this, the author argues that whenever a tumor is discovered as a result of some exaggerated or peculiar effect of a minor injury, the tumor was probably in existence for some time before the accident.

In conclusion, the article comments that in all cases in which neoplastic disease is found following an injury, thorough investigation is necessary to determine that the tumor discovered is really caused by the accident, rather than accidentally being found because of the injury. The three postulates given by the author are intended as a guide to the physician when he has occasion to deal with such cases.

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Monitoring in Surgery.—

A less expensive instrument for constant monitoring of blood pressure and electrocardiograms during surgery, particularly heart surgery, has been announced by the National Heart Institute of the U.S. Public Health Service Department of Health, Education, and Welfare. As in previous instruments, tracings representing both measurements are simultaneously shown on an oscilloscope screen for the inspection of the anesthesiologist, but the improved instrument makes use of the cheaper, less bulky and more frequently available single beam oscilloscope instead of the double beam instrument that was required in the past. This is made possible by an electronic switch which alternates the two patterns faster than the eye can follow, so that the observer sees two distinct patterns on the screen at all times. The switch has given satisfactory service in almost daily use at the National Heart Institute for over a year.

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Dyestuffs Banned.—

Three widely used coal-tar dyes have been removed from the list of coloring materials which may be added to food, the Food and Drug Administration announced recently, because recent scientific investigation has shown that while they are harmless in the amounts ordinarily consumed, they are not harmless when fed in large amounts. The colors affected are FD & C Orange Nos. 1 and 2 and FD & C Red No. 32. All may continue in use for external or cosmetic purposes. The action of the Food and Drug Administration indicates both the magnitude of the problem the agency faces in its work and the care with which the public health is protected by the agency; it is to its credit that action was taken on a potential hazard, even though no immediate danger appeared to exist.

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Potassium in Congestive Failure.—

The importance of potassium in congestive failure is emphasized by Perrin H. Long, M.D., of the Department of Medicine, State University of New York College of Medicine at New York City, writing under the title of The Iatrogenic Aspects of Heart Disease in the *New York State Journal of Medicine* for September 15, 1955. In discussing electrolyte balance Dr. Long points out that in congestive failure potassium tends to be lost from the body in sufficient amount to produce hypokalemia, and the loss tends to be greatest from the musculature of the failing chamber or chambers of the heart. In addition, the use of diuretics accentuates this loss, the diuresis resulting from digitalization included. He comments that digitalis intoxication is frequently associated with potassium deficiency and restoring potassium balance may reduce or eliminate this intoxication without stopping the use of digitalis. The general consideration of electrolytes as they apply to the question of congestive heart failure is summed up by him in the sentence: "Physician, remember potassium!"

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C-Reactive Protein.—

"The Relationship of C-Reactive Protein and Antistreptolysin O Titer to Rheumatic Fever" was discussed in the June, 1955, JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION. The authors of THE JOURNAL article concluded that both tests were helpful in determining the absence or presence of acute rheumatic fever, and that in the presence of active rheumatic fever the C-reactive protein was always present.

The use of the C-reactive protein test in a wide range of diseases was discussed in the article "Clinical Experience with the C-Reactive Protein Test" which appeared in the November, 1955, issue of *Archives of Internal Medicine*. The C-reactive protein, apparently

a beta globulin, is not found in the serum of normal humans, so that interpretation of the test is comparatively simple: any reactivity can be regarded as abnormal. The test is nonspecific for any disease process, but becomes positive within 14 to 26 hours following the onset of inflammatory or necrotizing processes.

The authors of the present article reported comparisons with other criteria of inflammatory or necrotizing processes, including body temperature, leukocyte count, and erythrocyte sedimentation rate. In general, the C-reactive protein test was found to be more reliable than the other criteria, but was less reliable than the sedimentation rate in tuberculosis.

In the series of patients reported, the protein was rarely present in patients in whom no inflammatory or necrotizing process could be found, was consistently present in bacterial infections, active rheumatic fever, acute myocardial infarction, and widespread malignant disease. It was usually, but not as consistently, present in active rheumatoid arthritis, virus infections, and tuberculosis. It was rarely found in limited primary carcinoma, uncomplicated chronic leukemia, multiple myeloma, and widespread superficial dermatitis.

The antiserum for this procedure is commercially available.

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A Growing Problem.—

Canine leptospirosis is a growing problem. This is the statement made by Robert J. Byrne, D.V.M., in an address before Pennsylvania's Third Annual Health Conference in August, 1954. The address "Canine Leptospirosis and Public Health," was published in *Public Health Reports* for December, 1955, and is reprinted in full on the advertising pages of this issue of THE JOURNAL. Dr. Byrne, who presented the address while he was with the Army Medical Service Graduate School in Washington, D.C., said that the incidence of the disease in human beings is unknown, but apparently on the increase. The incidence in dogs is known to be high. The problem is further complicated by the fact that many mammals other than dogs and human beings may harbor the pathogenic organism.

Leptospirosis in human beings is known by a number of names, depending on the particular Leptospira involved: Weil's disease is caused by Leptospira icterohemorrhagiae, mud fever by Leptospira grippotyphosa, akiyami or autumn fever by Leptospira autumnalis, and canicola fever, the disease with which this article is concerned, by Leptospira canicola. Leptospira canicola is the species usually found in dogs, but dogs, like other animals, may harbor other species as well.

The leptospires are passed from the body of the animal host in the urine; the organism has a peculiar affinity for the tissue of the renal cortex. Animals which have had a severe attack of leptospirosis are almost certain to become carriers if they recover from the disease. Transmission to man is accomplished by contact with infected urine.

The diagnosis of leptospirosis is difficult because its manifestations are protean and laboratory facilities capable of carrying out the needed tests are not universally available. In humans, approximately 50 per cent of cases involving Leptospira canicola will exhibit evidence of meningeal irritation. The author points out that whenever lymphocytes are found in the spinal fluid, leptospirosis should be considered in the differential diagnosis.

Treatment is largely an unsolved problem, none of the available antibiotics being particularly successful in quelling the infection. However, it has been reported that streptomycin or aureomycin in adequate dosage will eliminate the carrier state in dogs, and a favorable response to aureomycin or terramycin has been reported in human beings when the drug was administered on the first or second day of the disease.

The author concludes that control of the disease depends primarily upon breaking the chain of infection by adequate vaccination of dogs. Unfortunately, no vaccine exists at the present time. A plea is also entered for physicians to be conscious of the possibility of the appearance of the disease in their patients and for more laboratory facilities capable of dealing with the problem.

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In Briefer Form.—

The First International Symposium on Venereal Diseases and the Treponematoses will be held in Washington, D.C., from May 28 to June 1, 1956, at the Statler Hotel, according to a release from the United States Public Health Service. The Symposium is open to all physicians, scientists, and professional health workers who are interested in participating. . . . The Food and Drug Administration announced recently that it will permit the use of chlortetracycline as a preservative for uncooked poultry. The antibiotic, which is added to the water in which the poultry is chilled after dressing, may remain in the uncooked poultry in a concentration not to exceed seven parts per million in any part of the bird. The decision is based on evidence that chlortetracycline in this connection is completely destroyed by cooking. . . . A new form of penicillin, penicillin V, may make it feasible to use oral penicillin for some infections that now must be treated with parenteral penicillin, according to the *Proceedings of the Staff Meetings of the Mayo Clinic* for October 19, 1955. It was noted that penicillin V is readily absorbed when given orally and to date has induced few allergic reactions, but may be capable of causing the serious reactions sometimes associated with the use of penicillin G. . . . Evidence that a dentifrice containing stannous fluoride may be helpful in reducing the incidence of tooth decay in children is presented in *The Journal of the American Dental Association* for November, 1955. It was also noted that sodium fluoride in an otherwise identical dentifrice was in no way superior to the dentifrice without any fluoride at all. . . . The increased mortality attributed to carcinoma of the lung is real rather than apparent, according to Alexander G. Gilliam, M.D., writing in *Cancer* for November—December, 1955. Dr. Gilliam cited evidence to indicate that improvement in diagnosis has been one factor in the increase, but even with allowance made for this, there is still a real increase in mortality due to lung cancer.